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TETANUS PROPHYLAXIS.

By THOMAS H. ACKLAND,

Melbourne.

The master of a large ship crushed the index finger of his right hand with the anchor. Seven days later a somewhat foul discharge appeared; then trouble with his tongue—he complained that he could not speak properly . . . his jaws became pressed together, his teeth were locked, then symptoms appeared in his neck; on the third day opisthotonos appeared with sweating. Six days after the diagnosis was made he died.—HIPPOCRATES.

An inhuman calamity! an unseemly sight! a spectacle painful even to the beholder! an incurable malady! . . . With them, then who are overpowered by this disease, he (the physician) can merely sympathize. This is the great misfortune of the physician.—ARETÆUS.

Convulsions supervening on a wound are deadly.—HIPPOCRATES.

Those attacked by tetanus either die within four days, or if they get through these they recover.—HIPPOCRATES.

THESE descriptions of two thousand years ago show clearly that tetanus has been recognized not only as an entity, but also as a dreaded affliction, from ancient times. Although the disease is rare, its gravity when it does strike makes imperative the taking of every possible prophylactic measure.

Two pupils of Koch (Behring and Kitasato) first showed that it was possible to produce a passive immunity against tetanus with serum from an infected animal—and in their paper the word antitoxin was used for the first time. Behring injected guinea-pigs with tetanus organisms to obtain antitoxin in 1890. However, there are good reasons for maintaining that active immunization with toxoid should be carried out in certain members of the community, if not universally, and in the following groups this form of protection is particularly indicated: (i) In all child health programmes routine immunization with tetanus toxoid should be included. (ii) All those whose occupation is such that there is frequent opportunity for contamination of a wound with tetanus spores should be immunized. (iii) Patients with a history of allergy, especially those known to be hypersensitive to horses or cattle or their products, should be given tetanus toxoid. (iv) All patients who have received passive immunization in the form of tetanus antitoxin should be given active immunization for reasons which will be discussed later in this paper. (v) The active immunization of mothers during pregnancy has recently been suggested by Rubbo (1958). Neonatal tetanus, which comprises 4·9% of cases in an Australian series (Johnson, 1956), and 3·4% of deaths from tetanus in England (Conybeare and Logan, 1951), could be completely abolished by this step. (vi) Any patient who has recovered from clinical tetanus is advised to have active immunization, since immunity does not follow this disease. (vii) Consideration might well be given to a further category—all patients on surgical waiting lists. It is now the policy of the Royal Melbourne Hospital to immunize all in this group, with the exception of ear and eye patients. None of us knows when the catastrophe of tetanus may befall one of our own patients. This disease, although entirely preventible, is not always prevented; and there is there-

fore always present the unpalatable possibility that a calamity might have been averted. Thus the double tragedy of a death from tetanus is the loss to some family from the death itself, and with it perhaps a long remaining sense of guilt on the part of the medical attendant. Some have had to confess to the coroner that they simply forgot; others (and this is more likely to occur in large hospitals) have been the victims of confusion concerning exactly whose responsibility it is to administer prophylaxis; while still others have been frankly foolish and negligent. That the problem of adequate tetanus prevention is not fully solved is shown by the fact that there occur about 200 cases per year in England and Wales, with a mortality rate of 40% to 60%, while in Victoria for the past 10 years there has been an average of 11 cases yearly, with nine deaths. I firmly believe that every hospital should have written rules concerning the exact details of prophylaxis which are to be carried out at that hospital. It is thought by some that written rules regarding matters of this sort are undesirable in that, if regulations are not followed, the finger of guilt is pointed without question at somebody. On the other hand, this disadvantage must surely be accepted, and there is little doubt that over-all benefit would result if such a custom were followed.

When a patient has not received active immunization, there is wide variation of practice among different surgeons with regard to what occasions call for the administration of tetanus antiserum. Some believe that all patients with any break in the skin surface, however slight, should be given serum, and this is the general custom in American hospitals. In England, there is a tendency to omit prophylaxis for very trivial wounds. My own feeling is that it is impossible to differentiate those cases which are so trivial that they can be ignored, and it is therefore wise to give protection in every case associated with a breach of the skin surface. Tetanus may, of course, occur in patients who have had no one recent wound at all. Such cases are probably caused by some minute scratch incurred perhaps while the patient has been engaged in gardening or some similar occupation. It is worth remembering that the reopening of some wound in which tetanus spores may be dormant, such as the late search for a foreign body, or the removal of a bone plate, may be followed by tetanus—and therefore in such circumstances a prophylactic injection should be given. It would appear that there is a somewhat higher incidence of post-operative tetanus after joint operations than after operations elsewhere. Of 57 cases of tetanus notified in Victoria during the past five years, seven followed operations of election, and of these, four were operations on the knee or ankle joints. Tetanus under these circumstances is much more likely to be related to the fact that after a joint operation there is always some hæmarthrosis, than it is to any anoxæmia which may result from the use of the tourniquet as Rubbo (1958) suggests. Such anoxæmia must be extremely transient. Furthermore, while the operation is in progress, any organisms which may lodge in the wound are exposed to air, and, in addition, removal of the tourniquet is followed by hyperæmia. It is therefore difficult to believe that this factor is significant. Nevertheless, I believe Rubbo is correct in suggesting that patients who undergo operations on the knee joint should be protected against tetanus. Another important fact is the occurrence of tetanus in connexion with hand infections such as whitlow. In a recent English series of 50 consecutive cases in civilians (1928 to 1945), Cole (1951) found 10 cases of tetanus in association with whitlow, that is 20% of the total—a surprisingly high figure.

Test Doses of Tetanus Antiserum to Test for Serum Sensitivity.

Laurent and Parish, in a comprehensive discussion on anaphylactic serum reactions (1952), concluded that the intradermal test of hypersensitivity is an unsatisfactory one (as is also the scratch test and conjunctival instillation), because skin sensitivity is not necessarily an index of general sensitivity. Furthermore, they stated that the conception of desensitizing a patient by giving numerous small injections (either intradermal or subcutaneous without causing a reaction) was probably illusory, and that the frequent absence of a reaction to any dilution or dose meant rather that the patient was never generally hypersensitive.

There is no doubt whatever that the intradermal test does result in many difficult situations; and, since it is a general reaction in the patient which is feared, it is most logical to test for this, and not for a local skin reaction, by giving a very small dose of serum subcutaneously. But it seems likely that the 0·1 millilitre to 0·2 millilitre dose advocated by Laurent and Parish may on some occasions be dangerous. A fatality recently occurred in a country hospital after a child of four years had been given a routine intradermal test dose of 0·1 millilitre of tetanus antiserum. When collapse and cyanosis followed, one millilitre of adrenaline solution was at once given, but unfortunately death followed in spite of all resuscitative measures. However, it is possible, even probable, that the large dose of adrenaline was a factor in this fatal outcome.

I conclude that the only safe course is to give a very small subcutaneous test dose, a dose much smaller than 0·1 millilitre. Tetanus antitoxin already diluted 1/50 is now available for this purpose, and 0·5 millilitre of this diluted serum should be injected subcutaneously. The patient should then be observed for half an hour, while one watches for a general reaction and not for a local reaction of any kind. A syringe loaded with 1/1000 adrenaline solution should be at hand, together with ampoules of "Anthisan" or "Phenergan" for intravenous injection. A new salt of hydrocortisone, hydrocortisone sodium succinate ("Solu-Cortef"), which is very soluble and acts immediately when given intravenously, is now the most desirable drug to have at hand for anaphylactic emergencies. In the rare cases in which the giving of adrenaline is required, one should wait until the blood pressure is normal and any rashes have subsided, which may take up to six hours. A further test dose is then given (this time 0·2 millilitre of undiluted tetanus antiserum), and if there are no further symptoms after half an hour the full dose may be given. Even when there has been no reaction at all, and the full dose is given, the patient should still be observed for half an hour.

Circumstances in which Tetanus Antiserum is Sometimes Deliberately Omitted.

1. A positive reaction to the skin sensitivity test. In one English group of 8900 patients considered to need protection, there was a positive or considered positive reaction to the skin test in 1027 (Moynihan, 1956)—the extraordinary figure of 11·5%—and tetanus antiserum was omitted in these cases. Subsequent skin tests with water and saline on 200 such patients showed a very high proportion of similar skin reactions, and all of these 200 patients were actually given a full dose of tetanus antiserum without ill effects other than a few late serum skin reactions, and a few local reactions at the site of the injection. This certainly emphasizes the unreliability of the skin sensitivity test. On the other hand, in this country one must admit that the usual procedure is not to omit the giving of tetanus antiserum when a skin test is thought to give a positive result, but to desensitize these patients, eventually giving the full dose.

2. The occurrence of general signs, such as malaise, headache, flushing, rapid pulse, nausea, abdominal pain and dyspnœa after either an intradermal or subcutaneous test dose. Such cases can, however, usually be managed as has been already indicated, and the full dose given.

3. Some previous injection of tetanus antiserum. To omit tetanus antiserum for this reason would be quite wrong, since effective protection after a dose of 1500 units does not last even four weeks.

4. A history of allergy.

5. Refusal by the patient.

6. Wound thought to be too trivial.

7. Forgetting, or the belief that somebody else will administer the serum.

The Titre of Tetanus Antiserum Required to Give Protection and the Duration of Passive Immunity.

In human beings, clinical protection from tetanus requires a titre of 0·01 to 0·1 unit of passively introduced

antitoxin, but of only 0·001 to 0·01 unit when active immunity has been induced. The administration of 1500 units of tetanus antiserum will provide three weeks of immunity (Bigler and Werner, 1941), while 10,000 units provide a cover for up to ten weeks, with a level of 0·1 unit for four to six weeks, and 0·01 unit to six to ten weeks (Cooke and Jones, 1943).

However, it is most important to realize that if an animal or person has had a previous serum injection, the antitoxin now given will disappear much more rapidly than it otherwise would. This was shown quite conclusively in 1937 by Sacquepée and Jude, and other workers such as Littlewood confirmed this in 1954. So, under such circumstances, the duration of adequate immunity may be only a few days. I am sure that most of us have been both guilty and fortunate in this regard, and of course tetanus does occasionally develop for this reason, two or three weeks after a prophylactic injection of 1500 units. Therefore, since quite a large number of patients coming for protection have in fact received one or more previous injections of tetanus antiserum, this leads inevitably to the conclusion that once a patient has had an injection of tetanus antiserum he should be promptly immunized with tetanus toxoid. This ideal should not only receive our very earnest attention, but should also be put into practice forthwith.

Active Immunization.

There are certain problems concerned with the carrying out of active immunization, one obvious difficulty being that the patient may not be willing to return for the further injections which are required. However, our larger hospitals should certainly take the lead in offering this service, and patients should be advised of the benefits to be obtained.

In the bringing about of an active immunity, the general principle has been established that there must be a sensitizing stimulus or primary antigenic stimulus in the form of one injection (or preferably two closely spaced injections) of tetanus toxoid, followed at an interval of five to six weeks by an activating or immunizing dose. This was first demonstrated by Glenny and Südmersen in 1921 in relation to diphtheria, and confirmed by Cooke and Jones in 1943 with regard to tetanus. The possibility of bringing about a rapid immunity by using tetanus toxoid immediately after the infliction of a wound, in a patient who has never had it before, has also been considered by Cooke and Jones. These workers gave children one millilitre of toxoid every second day for four doses, and eight weeks later a single dose of one millilitre of toxoid. They made continual estimations of the blood titre of antitoxin which resulted. There was no detectable antitoxin in the blood after the first series of injections, but it quickly appeared after the activating dose eight weeks later. It may therefore be concluded that it is not possible to bring about an effective immunity by administering tetanus toxoid immediately after an injury.

The Influence of Heterologous Antitoxin on the Antigenic Action of Toxoid.

It is most important to consider what effect there is from the presence of heterologous antitoxin (that is injected tetanus antiserum) on the antigenic action of toxoid; and a study of this problem is essential if an efficient changeover from passive to active immunity is to be made. It is only when passive antitoxin titres have reached a very low level that active toxoid immunization becomes effective. In other words, only free toxoid can produce the primary sensitization of tissues needed for an active immunity response to a later injection. If there is an excess of heterologous antitoxin present, the toxoid is neutralized and rendered inert, then having little sensitizing effect with no influence as an antigen. It would appear, therefore, that it is desirable not to give the initial toxoid injection at the same time as an injection of antitoxin. This is certainly so if the injection of tetanus antiserum is a large one such as 10,000 units. If the injection of tetanus antiserum is 1500 units, it may be permissible to give the initial toxoid injection on the same occasion, especially if a second sensitising dose will be given two weeks later. However, there will be those who prefer to delay the beginning of active immunization for several weeks after the tetanus antiserum injection. At any rate, the principle of simultaneous sero-vaccination has no sound basis.

A clinical experiment carried out by Cooke and Jones provides convincing evidence concerning this question. Antitoxin titrations were performed by these workers on five groups of children, all of whom were given tetanus antiserum at the beginning of the experiment, and then were given tetanus toxoid at increasing intervals. All of the children in the first four groups, 12 children, were given 10,000 units of tetanus antiserum. Then, in Group I, toxoid was given at the same time as the tetanus antiserum, and continued at two-weekly intervals. In Group II, toxoid was given two weeks after the tetanus antiserum and continued at two-weekly intervals. In Group III, toxoid was given four weeks after the tetanus antiserum and continued at two-weekly intervals, and in Group IV toxoid was given six weeks after the tetanus antiserum and continued at two-weekly intervals. Group V, however, had only 1500 units of tetanus antiserum, the toxoid being started two weeks later and continued at two-weekly intervals for five doses.

The striking feature of this experiment was the low titre of passive immunity reached before active immunity appeared, and, of course, those in Group V, who had only 1500 and not 10,000 units, had an advantage in this respect. Thus the disappearance of the inhibiting effect of the passive antitoxin is more important in the early development of active immunity than the time at which immunization is started.

Immunity After Clinical Tetanus.

It is a curious fact that not only does antitoxic immunity not follow recovery from clinical tetanus, but also the amount of antigen (toxin) absorbed during an infection is so small that not even is a primary antigenic stimulus or sensitization produced, to make a later activating toxoid injection effective. This certainly emphasizes the extreme potency of such quantities of tetanus toxin as are absorbed. It is therefore necessary to ignore the fact that the disease has occurred and start afresh.

Tetanus Prophylaxis: Suggested Routine.

The following is suggested as the routine management of patients with injuries requiring prophylaxis:

1. For patients (*a*) who have never been immunized with tetanus toxoid, (*b*) whose last toxoid injection was not within five years, (*c*) whose previous immunization is doubtful: for these patients, passive followed by active immunization is advised. In passive immunization, 1500 units of tetanus antiserum (3000 units in cases of delayed treatment) are given, or 10,000 units when it is known that the patient has had tetanus antiserum previously. For severe and persistent infections, tetanus antiserum should be given again after one week. In active immunization, one millilitre of tetanus toxoid is given (if given at the same time as 1500 units of tetanus antiserum, the toxoid should be injected from a second syringe into the opposite limb). Three weeks later a second sensitizing dose of one millilitre of tetanus toxoid is given. After a further six weeks an immunizing dose of one millilitre of tetanus toxoid is given. When 10,000 units of tetanus antiserum have been given, the first toxoid dose should be delayed one month. When the dose of tetanus antiserum has been repeated, the second sensitizing dose of tetanus toxoid should be given three weeks after this second dose of tetanus antiserum, with the immunizing dose six weeks later.

2. For patients in whom there is definite evidence that they have been actively immunized with tetanus toxoid within five years. (*a*) For simple lacerations and punctures, one millilitre of tetanus toxoid alone as a "booster" dose is given. (*b*) For severe and infected wounds, or if the wound is deeply penetrating, both tetanus antiserum and toxoid are given, regardless of the time interval since the last tetanus toxoid injection (separate syringes, opposite limbs). In such a case a further "booster" dose of toxoid should be given two weeks later.

Finally, it is high time that there was devised some sort of universal record system for these inoculations and in the meanwhile cards such as those recently issued to Victorian stevedores could well be used in other industries. Most patients know nothing of the difference between passive and active immunization, and it is rarely possible to determine accurately whether some previous injection has been one of tetanus antiserum or toxoid. We now have in use at the Royal Melbourne Hospital such a card (Figure I), and active immunization is offered to all patients who come with a wound requiring tetanus antiserum. Most patients are accepting this offer.

THE ROYAL MELBOURNE HOSPITAL

TETANUS IMMUNIZATION CARD

NAME: AGE: M/F DATE:

To protect you against tetanus in future injuries, your doctor advises you to have a complete course of injections.

You have received your first dose of TETANUS TOXOID for tetanus immunization.

You are required to attend

THE ROYAL MELBOURNE HOSPITAL CASUALTY CLINIC

Between 9 a.m. and 4.30 p.m., or

YOUR PRIVATE DOCTOR

for further injections on _____/_____/_____

and on _____/_____/_____

N.B.—To maintain your immunity, you should report for "booster" injections of tetanus toxoid every four years.

Doctor's Record of Injections

A.T.S.	Date	Dose	Reaction	Doctor's Signature

Tetanus Toxoid	Date	Dose	Doctor's Signature

FIGURE I.

Record card now in use at the Royal Melbourne Hospital.

Conclusions.

1. The problem of tetanus prevention is not yet fully solved.

2. Much wider use of active immunization should be publicly encouraged.

3. A universal record system of inoculation cards is urgently required, so as to bring about an end to haphazard and unrecorded injections.

References.

BIGLER, J. A., and WERNER, M. (1941), "Active Immunization Against Tetanus and Diphtheria in Infants and Children", *J.A.M.A.*, 116: 2355.

COLE, L. (1953), "The Prevention and Treatment of Tetanus", *Brit. M. J.*, 1: 150.

CONYBEARE, E. T., and LOGAN, W. P. D. (1951), "The Incidence and Prevention of Tetanus Among Civilians", *Brit. M. J.*, 1: 504.

COOKE, J. V., and JONES, F. G. (1943), "The Duration of Passive Tetanus Immunity", *J.A.M.A.*, 121: 1201.

GLENNY, A. T., and SUDMERSEN, H. J. (1921), "Notes on Production of Immunity to Diphtheria Toxin", *J. Hyg.*, 20: 176.

JOHNSON, D. W. (1956), "Epidemiology of Tetanus in Queensland", M. J. AUSTRALIA, 2: 710.

LAURENT, L. J. M., and PARISH, H. J. (1952), "Serum Reactions and Serum Sensitivity Tests", *Brit. M. J.*, 1: 1294.

LITTLEWOOD, A. H. M., MANT, A. K., and WRIGHT, G. P. (1954), "Fatal Tetanus in Boy After Prophylactic Tetanus Antitoxin", *Brit. M. J.*, 2: 444.

MOYNIHAN, N. H. (1956), "Tetanus Prophylaxis and Serum Sensitivity Tests", *Brit. M. J.*, 1: 260.

RUBBO, S. D. (1958), "Prevention of Post-Operative Tetanus", *Lancet*, 2: 268.

SACQUEPÉE, E., and JUDE, A. (1937), *"Sur l'immunité conféré par le sérum"*, *Rev. immunol.*, 3: 444.

PERSISTENCE OF TETANUS ANTITOXIN IN CHILDREN TWO YEARS AFTER A THIRD DOSE OF TETANUS TOXOID.

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AND

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THE satisfactory tetanus antitoxin response of children six months after a primary course of immunization and seven and fourteen days after a third or "booster" dose of different antigens containing tetanus toxoid has been reported previously (Wiener *et alii*, 1955). The investigation reported here presents data on the persistence of circulating tetanus antitoxin in these children two years later.

Method and Materials.

Originally, each of 64 children had received two doses of combined diphtheria and tetanus toxoid, with an interval of six weeks between doses. Six months after the second dose, these children were divided into six groups, and, after samples of blood had been taken, injected with a "booster" dose of a preparation containing tetanus toxoid as follows: Groups I and II received 0·25 millilitre and 0·5 millilitre of combined diphtheria and tetanus toxoid respectively. Group III received 0·5 millilitre of purified tetanus toxoid adsorbed on aluminium phosphate. Group IV received one millilitre of formalinized tetanus toxoid. Group V and Group VI received five and ten Lf respectively of purified tetanus toxoid in normal saline. Samples of blood were taken, and the titre of tetanus antitoxin was determined. The results of these tests have been reported previously (Wiener *et alii*, 1955).

Two years after they had been injected with one or other of the different antigens, blood was again taken from 29 of these children, and assayed for tetanus antitoxin in mice against the reference Medical Research Council Standard antitoxin or a local substandard serum at the L+/1000 or L+/100 level of dosage.

Results.

Table I shows the titres of tetanus antitoxin two years after the "booster" dose of different antigens containing tetanus toxoid. For comparison, the antitoxin titre in the serum of these children before, and fourteen days after, the "booster" dose are also included. Two years after the "booster" dose, each of the 29 children had more than 0·1 unit of tetanus antitoxin per millilitre of serum. Individual titres were considerably higher than 0·1 unit, and the mean titre of all children was 0·4 unit per millilitre. It is of interest to note that two years after the third or "booster" dose of tetanus toxoid, the mean titre was higher than it was six months after the second dose, when it was 0·1 unit per millilitre. At two years, no significant differences were found in the responses to the different antigens used as a "booster" dose for the various groups. Comparison between the responses after fourteen days and two years showed that those children who had a higher titre initially maintained a higher titre two years later ($0{\cdot}05 > P > 0{\cdot}01$).

Discussion.

It is generally accepted that after active immunization a serum level of 0·01 or more units of tetanus antitoxin per millilitre of serum will protect against the development of clinical tetanus. On this basis all the children reported here had a protective titre of tetanus antitoxin in their serum for two years after their third dose of tetanus toxoid.

The degree of protection attained at the end of this period was uninfluenced by the type or dose of antigen used in the "booster" dose. Both fluid and adsorbed toxoids, either alone or in combination with diphtheria toxoid, were equally satisfactory in maintaining a protective titre of tetanus antitoxin. Halving the amount of toxoid in the booster dose did not reduce the level of tetanus antitoxin two years later. It is of particular interest to note that by using as a third dose purified fluid toxoid in saline without the addition of aluminium phosphate, protection was maintained as well as with adsorbed toxoid. It thus appears that if an individual has once been adequately sensitized to tetanus toxoid by an effective primary course of immunization, a variety of antigens containing tetanus toxoid can be expected to provide protection for a number of years. We have shown previously (Wiener *et alii*, 1955) that two doses of combined diphtheria and tetanus toxoid adequately sensitize an individual to tetanus toxoid, so that he can produce tetanus antitoxin rapidly and in a high titre when a "booster" dose is administered six months later.

TABLE I.

Tetanus Antitoxin Units per Millilitre of Serum Just Prior to and Fourteen Days and Two Years after a "Booster" Dose of Different Antigens Containing Tetanus Toxoid.

Group.	Antigens and Amount of Tetanus Toxoid per Injection.	Titres of Tetanus Antitoxin. (Units per Millilitre of Serum.)		
		Before "Booster" Dose.	At Fourteen Days.	At Two Years.
I	Combined diphtheria and tetanus toxoids, 1·25 Lf.	0·13	8·5	0·60
		0·13	4·6	0·24
		0·13	7·6	0·24
		0·13	3·7	0·60
		0·13	8·5	0·70
	Mean[1]	0·13	6·2	0·43
II	Combined diphtheria and tetanus toxoids, 2·5 Lf.	0·02	1·2	0·12
		0·10	4·7	0·17
		0·10	3·5	0·38
		0·10	—	0·85
		0·10	5·2	0·60
	Mean	0·07	3·2	0·33
III	Purified tetanus toxoid adsorbed on aluminium phosphate, 2·5 Lf.	0·06	5·0	0·70
		0·09	8·1	0·38
		0·13	14·6	1·2
		0·13	5·0	0·28
	Mean	0·09	7·4	0·55
IV	Formalinized toxoid 2·5 to 5·0 Lf.	0·03	5·7	0·17
		0·12	23·0	0·70
		0·13	23·0	0·70
		0·13	13·8	0·99
		0·24	17·4	2·4
		0·24	9·7	0·24
	Mean	0·12	13·8	0·60
V	Purified liquid toxoid, 5·0 Lf.	0·05	13·0	0·20
		0·09	6·4	0·17
		0·13	18·0	2·9
		0·14	12·0	0·17
		0·14	16·0	0·44
	Mean	0·10	12·3	0·37
VI	Purified liquid toxoid 10·0 Lf.	0·03	16·0	0·12
		0·13	13·0	0·60
		0·13	18·0	0·60
		0·25	13·0	0·38
	Mean	0·11	14·8	0·36

[1] Geometric mean.

The importance of this third or "booster" dose of tetanus toxoid in maintaining a protective level of tetanus antitoxin is shown by our findings that two years after its administration the mean titre was four times higher than six months after the second dose. Evans (1943) similarly observed that the titre of antitoxin in 11 subjects eighteen months after the third dose was considerably higher than ten months after the second dose. More recently, Peterson *et alii* (1955) also observed that after a third dose of tetanus toxoid a higher level of sustained antitoxic immunity resulted than when only two injections had been given. The administration of a third dose of tetanus toxoid six to twelve months after the second dose is now standard practice in Australia when active immunization against tetanus is being carried out.

Although the maximum titre which an individual can produce is not the only factor which influences the long-term duration of immunity (Jensen, 1933), it appears that those children who had produced a high titre fourteen days after the "booster" dose maintained a higher titre at the end of two years. A similar positive correlation has been found previously, when "pre-booster" titres were compared with those obtained seven days after the "booster" dose (Wiener *et alii*, 1955).

From our data available at present, it is not possible to state for how much longer than two years a protective level of antitoxin will be maintained. However, Peterson *et alii* (1955) have shown that, after primary immunization or a stimulating dose of tetanus toxoid, the majority of 213 individuals had protective levels of tetanus antitoxin up to 13 years. Provided a good basic immunity against tetanus has been established, routine booster injections every five years should be sufficient in civilian practice to maintain protection against tetanus (North and Patterson, 1953). Furthermore, the immediate and marked rise in the titre of tetanus antitoxin which will occur in these cases, even with relatively small doses of tetanus toxoid, can be relied upon to provide additional protection when tetanus toxoid is used as a "wound booster" in case of injury.

Summary.

Two years after having received a third dose of different preparations containing tetanus toxoid, all of 29 children had more than 0·1 unit of tetanus antitoxin per millilitre of serum.

Provided a satisfactory basic immunity has been established by means of two injections of adsorbed tetanus toxoid, a third dose of either fluid or adsorbed toxoid injected six months after the second dose will provide protection against tetanus for at least two years.

Those children who responded with a higher titre of tetanus antitoxin fourteen days after the third dose continued to maintain a higher titre than did those whose initial response was lower.

Acknowledgement.

We are grateful to Dr. J. J. Graydon for carrying out the statistical analysis.

References.

EVANS, D. G. (1943), "Persistence of Tetanus Antitoxin in Man Following Active Immunization", *Lancet*, 2: 316.

JENSEN, C. (1933), "Antitoxin Curve in Children after Active Immunization with Diphtheria Anatoxin with Special Reference to the Duration of the Antitoxic Immunity", *Acta path. et microbiol. scandinav.*, 10: 137.

NORTH, E. A., and PATTERSON, R. W. (1953), "Active Immunization against Tetanus", M. J. AUSTRALIA, 1: 797.

PETERSON, J. C., CHRISTIE, A., and WILLIAMS, W. C. (1955), "Tetanus Immunization. IX. Study of the Duration of Primary Immunity and the Response to Late Stimulating Doses of Tetanus Toxoid", *Am. J. Dis. Child.*, 89: 295.

WIENER, S., PATTERSON, R. W., and MACKENZIE, E. F. (1955), "Antibody Response to a Stimulating Dose of Tetanus Toxoid in Children Previously Immunized with Combined Diphtheria and Tetanus Toxoids", M. J. AUSTRALIA, 1: 633.

A MORBIDITY SURVEY OF RHEUMATISM IN SYDNEY.

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No morbidity figures are available on the prevalence of chronic diseases in Australia. To remedy this defect the Australian Rheumatism Council instituted an inquiry based on interviews with householders in a sample of dwellings in the city and suburbs of Sydney. No medical examination was made. Information was sought concerning the prevalence of and incapacity due to rheumatic complaints and certain other specified chronic diseases (diabetes, chronic bronchitis, peptic ulcer) and physical handicaps (e.g., spastic paralysis, epilepsy, blindness).

This report deals with the method of conducting the survey and the results obtained relating to the rheumatic diseases. The results relating to chronic disease other than the rheumatic diseases and to incapacity will be the subject of a separate report.

A small pilot survey was arranged by one of us (H.O.L.) on some 200 households to ascertain whether a reasonable proportion of householders could be expected to respond. a *questionnaire*. This demonstrated that an adequate proportion of householders could be expected to respond. In the absence of any medical unit trained for the purpose, the Council was glad to accept the offer of the Life Offices' Association for Australasia to allow some of the field members of their staff to act as canvassers for the survey. The Bureau of Census and Statistics, Canberra, was responsible for (i) the design of the sample, (ii) the design and testing of the schedule, (iii) the briefing of the interviewers, (iv) the organization of the field procedures, (v) the coding and machine tabulations. We shall not consider (v) here further, but some notes on the other points are made.

Sample Design.

A sample of one in every 500 of the households in Sydney was regarded as about the most that could be expected with the resources at our disposal. Now a completely random design would give every household in Sydney an equal chance of entering the survey, independently of every other, but this would have entailed excessive travelling for the interviewers. A modified design, now standard in this type of survey, was adopted, which still gave every household the same chance of coming into the survey, but ensured that the households fell into clusters, more convenient for the interviewers. Institutional dwellings such as hotels, large boarding houses, schools, hospitals and establishments of the armed forces were excluded. A responsible person, usually the wife of the householder, was interviewed, from whom answers were obtained about all other persons in the dwelling. A person away from his dwelling at the time of the survey was regarded as a member of the household, unless he had been away more than a month. Visitors staying in the sampled dwellings were not included unless their visits were to exceed one month or there was no one in residence at their usual dwelling. This convention assured that each person had one and only one chance of being enumerated in the survey. When the sample dwelling was found to contain more than one household, a representative of each household in the dwelling was interviewed.

The Questionnaire Schedule.

The schedule was prepared by the authors, assisted by Dr. Ralph Reader and officers of the Bureau. The questions were of four types: (i) General questions, which covered the sex, age, marital status, occupation, industry and pension. (ii) Questions on rheumatic conditions, which related to rheumatic symptoms experienced between January, 1956, and the time of the interview (October, 1956), to medical diagnosis and treatment of rheumatic complaints and to time lost from work or school. (iii) Questions on other chronic diseases in which the subject was asked whether he suffered from any of a list of chronic diseases. (iv) Questions on physical handicaps and chronic disabling conditions such as spastic paralysis, epilepsy, blindness and residual paralysis due to poliomyelitis. Questions were asked also about time lost through the three groups of diseases.

The Proportion Responding.

Of the dwellings visited, 45 were vacant and six were under construction. They necessarily were not part of the survey as they do not correspond to any persons. Out of the 1054 occupied dwellings, the canvasser failed to contact the householder of 38 after repeated calls; there was refusal to cooperate in 32 households, and language difficulties made cooperation impossible in 17. So the proportion of non-response was 87 in 1054 or 8·3%.

The Interviewers.

The interviewers (or canvassers) were experienced members of the field staff of the Life Offices' Association accustomed in their daily work to the tasks of filling in health *questionnaires* and dealing with the public in their own homes. If contact was not made with the householder the first day, the interviewer, in general, returned on another day. In any case, if he failed to make the contact, a member of the School of Public Health and Tropical Medicine visited the house. The interviewers were instructed in the method of filling in the *questionnaire* schedule by members of the Bureau of Census and Statistics and of the Australian Rheumatism Council.

The Prevalence of the Rheumatic Diseases.

The survey resulted in details being collected of 1608 males and 1656 females, 3264 in all, living in some 967 dwellings. In Table I are given the proportion of persons of each age and sex who suffered from rheumatic disease during the past year. The diagnoses were made by one of us (S.G.N.) from the answers given to the *questionnaire*. There was a blanket question directed towards each group of symptoms with more precise questions to follow if the answer was positive. The results are given in Table I as percentages; the actual numbers can be recovered by multiplying the proportion by the number in the group. The proportion who had suffered from at least one of these diseases is given in Table I. This proportion was approximately 11% of males and 9% of females up to the age of 14 years last birthday, and there was a steady rise throughout life—up to 38% of males and 42% of females at ages over 65 years.

Individual diseases showed different age distributions. Thus growing pains, which may be regarded often as subclinical rheumatic fever, were experienced by 7% of children under the age of 15 years. Rheumatic fever had occurred in about 1% of all children under 15 years. Symptoms suggestive of gout were present in 1% of males and 0·5% of females over the age of 35 years. Painful shoulder was relatively common, the proportions being over 1·6% in either sex. The disk syndrome was also relatively common. The commonest syndrome was the rather vague, non-articular rheumatism, which varies from some rather vague aches and pains up to disabling symptoms, preventing work or housework. Ankylosing spondylitis was noted in a total of four persons. The great bulk of the disabling disease no doubt would be due to osteoarthritis. Thus more than 15% of males and 22% of females at ages above 65 years had suffered from osteoarthritis, and over 8% and 9% respectively from rheumatoid arthritis in the last year. We may conclude this section by noting that rheumatic fever is still an important disease in childhood, and the osteoarthritic and rheumatoid group of diseases is very important in old age.

In the population at all ages, 17% of males and 22% of females have suffered rheumatic symptoms in the last year, or about one in five of the general population. Only 215 out of the 642 sufferers had consulted a doctor in the period covered by the survey. Of the 642, 89 had a multiple diagnosis.

It may be noted that the prevalence of both rheumatoid arthritis and osteoarthritis increases with age. This does

TABLE I.

The Prevalence of Rheumatic Complaints Classified by Age and Sex.

Complaint.	The Proportion Affected by the Complaint by Age in Years and by Sex.									
	0 to 14.		15 to 34.		35 to 64.		65 and Over.		All Ages.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
Growing pains	7·63	7·02	0·90	1·32	0	0	0	0	2·42	2·12
Rheumatic fever	1·96	0·48	1·36	1·10	0·17	0·81	0·78	0·60	1·06	0·78
Gout	0	0	0	0	0·87	0·32	1·56	0·60	0·43	0·18
Painful shoulder	0	0·24	1·81	0·44	2·42	3·70	3·13	1·20	1·62	1·69
Disk syndrome	0	0	1·58	0·88	3·46	5·30	5·47	4·19	2·11	2·66
Non-articular rheumatism	1·52	0·49	4·06	8·37	10·55	9·65	10·93	9·58	6·22	7·00
Ankylosing spondylitis	0	0	0	0	0·35	0·16	0·78	0	0·19	0·06
Osteoarthritis	0	0	1·13	1·54	6·40	9·16	15·63	21·56	3·86	6·04
Rheumatoid arthritis	0	0·49	0·90	1·99	2·42	7·56	8·59	9·58	1·80	4·47
Total sufferers	10·89	8·72	10·16	14·98	23·35	30·39	38·28	41·92	17·35	21·92
No complaints	89·11	91·28	89·84	85·02	76·65	69·61	61·72	58·08	82·65	78·08
Total	459	413	443	454	578	622	128	167	1608	1656

not necessarily imply that the disease commences usually at the higher ages. The proportion affected is indeed what is known in statistical theory as the cumulative frequency. The data are not sufficiently extensive to allow us to estimate the age at onset of these diseases.

In arriving at a presumptive diagnosis for the construction of Table I, the combination of symptoms present was considered. For example, when morning stiffness was associated with painful or swollen hands and knees, the diagnosis of rheumatoid arthritis was made. In some cases, the diagnosis of the medical attendant was quoted by the householder. This was used if it appeared compatible with the symptoms, otherwise it was ignored. Certain patients were judged to have two rheumatic conditions, and both were recorded. In some cases, in which there was doubt as to whether the condition should be diagnosed as non-articular rheumatism or as osteoarthritis or disk lesion, the less serious condition was diagnosed. The heading non-articular rheumatism therefore probably included some cases of disk lesion, the diagnosis of which was made on the coexistence of painful back and sciatica, and some cases of ankylosing spondylitis. The *questionnaire* was found to contain insufficient data for the diagnosis of ankylosing spondylitis. The figures relating to this disease are therefore probably too low. In all, about 17% of all males and 22% of all females are believed to be suffering from rheumatic diseases. The frequencies of the different symptoms are set out in Table II by age and sex.

In Table III are given the percentages of persons with rheumatic complaints. The over-all rate is 17% for males and 22% for females, and there is not a great amount of variation by occupation. Naturally the rates in school children are lower, and the voluntarily idle or retired class the rates are higher than the general mean.

The prevalence of rheumatic complaints varied considerably over the different pension classes. Thus, of 2293 persons not in receipt of any pension, 18% suffered from a rheumatic complaint, of 161 old age pensioners 38·51%, of 34 invalid pensioners 50%, and of 75 war pensioners 36% suffered from a rheumatic complaint.

Incapacity Caused by Rheumatism.

It is appropriate to give some measure of the amount of incapacity caused by the rheumatic diseases. The term incapacity is used here to cover the meanings conveyed by the phrase away from work for those who usually work, unable to do housework for those with domestic duties, away from school for school children and confined to bed for all others. The results are detailed in Table IV, from which it is clear that the rheumatic diseases cause a considerable loss of time from work or other usual activities. Thus, of those gainfully employed, each man lost on an average 0·12 week in a year, but those suffering from rheumatic diseases lost, on an average, 3·33 weeks in a year. The losses for those engaged in domestic duties were even higher. An average of 0·34 week was lost in a year by all members of the group, and for those incapacitated an average of 6·09 weeks was lost in the year. For 10 school children with rheumatic disease, the average loss of school was 5·60 weeks. We have seen already in Table III that rheumatism is a serious cause of permanent incapacity. It is evident that there is a large over-all burden on the community. Indeed, 150

TABLE II.

The Symptoms of Rheumatic Diseases.

Symptom.	The Proportion of Persons with Symptoms by Age in Years and by Sex.									
	0 to 14.		15 to 34.		35 to 64.		65 and Over.		All Ages.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
Morning stiffness of joints	0	5·56	31·11	17·65	37·78	51·85	46·94	54·93	31·54	41·60
Stiffness passing off during the day	0	5·56	24·44	13·24	30·37	38·62	28·57	29·58	23·65	28·93
Painful or swollen hands	0	2·78	6·67	10·29	9·63	38·62	22·45	38·03	9·68	29·75
Painful or swollen knees	4·0	2·78	11·11	11·76	22·96	23·81	36·73	39·44	20·07	22·59
Painful or swollen shoulder	0	5·56	31·11	5·88	21·48	32·80	22·45	16·90	19·35	22·04
Painful or swollen hips	0	2·78	6·67	4·41	8·15	14·29	14·29	16·90	7·53	11·85
Painful or swollen other joints	4·00	5·56	26·67	17·65	27·41	44·97	36·73	39·44	24·73	34·99
Pain in the back	4·00	0	24·44	35·29	37·04	39·15	40·82	40·85	29·75	34·99
Sciatica	4·00	0	17·78	5·88	14·81	22·22	16·33	15·49	13·62	15·70
Growing pains and rheumatic fever	88·00	86·11	22·22	16·18	0·74	2·65	2·08	1·41	20·07	13·22
Other muscular pains	0	0	20·00	33·82	40·00	40·21	46·94	36·62	30·82	34·99
Number of sufferers	50	36	45	68	135	189	49	70	279	363

weeks are estimated as having been lost to industry by the sufferers in the group of those who work in a job or business. This group comprised approximately one-third of the total sample of 3264 persons. If we take a figure of one-half of this to allow for an extremely high sampling error and work on a basis of 75 weeks lost per 3264 persons in the community from rheumatic complaints, one

TABLE III.

The Prevalence of Rheumatism by Occupation.

Occupation.	Males.		Females.	
	Total Number.	Percentage with Rheumatic Complaints.	Total Number	Percentage with Rheumatic Complaints.
Professional, administrative and clerical workers ..	300	16·99	160	10·63
Sales and service workers, etc.	150	20·00	69	20·29
Workers in transport and communication	90	15·89	3	—
Workers in building and construction ..	88	25·00	0	—
Craftsmen, production processes, labourers	345	16·81	60	21·67
Not stated	8	—	2	—
Total	987	18·24	294	15·31
Domestic duties	5	—	836	29·31
School pupil	359	13·65	300	12·33
Child under school age ..	140	4·29	149	2·01
Voluntarily idle or retired	87	35·63	61	39·34
Permanently incapacitated	30	43·33	16	56·25
Grand total ..	1608	17·35	1656	21·92

may estimate the loss to industry *per annum* in Australia as 225,000 weeks. At an average remuneration of even £10 per week, this would place the cost in wages lost alone at £2,250,000, apart from loss of production and cost of medical attention and medicines for the work force.

TABLE IV.

The Incapacity Caused by the Rheumatic Diseases.

Usual Activity.	Total Number in Sample Interviewed.	Sufferers from Rheumatic Complaint.	Incapacitated by Rheumatic Disease.	Average Loss in Weeks.[2]	
				Per Person.	Per Incapacitated.
Gainful occupation	1281	225	45 (5)[1]	0·12	3·33
Domestic duties	841	245	47 (11)	0·34	6·09
School attendance ..	659	86	10 (2)	0·09	5·60
Pre-school childhood ..	280	0	0	0	0
Retirement, permanently incapacitated ..	194	77	21 (6)	1·38	12·71
Total ..	3264	642	123 (24)	0·23	6·17

[1] The figures in parentheses indicate the number who did not state the period of incapacity.

[2] These averages are understatements, as we are unable to add in the weeks lost by those who did not state the period of incapacity. They are all losses in a period of ten months.

The Accuracy of the Survey.

At some point the estimates in our sample can be compared with published statistics. Thus there were 4·93% old age pensioners in our survey as against 5·06% in New South Wales, excluding those pensioners in institutions. Our sample contained 1·04% invalid pensioners against 1·14% in New South Wales, excluding again those in institutions. There were 2·29% repatriation (that is war) pensioners in our sample, against 2·15% in New South Wales. These three differences are slight, and are readily explained as being due to sampling variation. It is concluded that the sample selected is reasonably accurate.

Interview Errors.

Cobb (1954) has considered the probable losses in reporting in a survey similar to our own. An individual with pathological lesions may have no symptoms, and hence will be lost in any case. On the other hand, he may have symptoms and yet forget them, consider them unimportant or refuse to disclose them. These again will be losses. In favourable cases the symptoms will be known to the interviewer, and so will be included in the survey. Our survey is therefore liable to give an underestimate of the extent of the symptoms.

Errors in Diagnosis.

The diagnoses we have made are liable to error, perhaps because of improper answers by the householders, defects in interviewing technique, insufficient data (for example in ankylosing spondylitis) and incorrect interpretation of the data. Some overseas workers have used a survey such as ours and then followed it up with a clinical study.

Comparison of these results with those obtained by overseas observers using a combination of interview technique and physical examination shows a remarkable degree of conformity.

Results of Other Workers on the Prevalence of Rheumatoid Arthritis.

Kellgren, Lawrence and Aitken-Swan (1953) found a prevalence rate of rheumatoid arthritis of 1·4% males and 3·3% females (total 2·4%) in the group over 15 years of age in the town of Leigh in Lancashire, based on brief clinical examination in the home. In a later study of the group aged 55 to 64 years, in the same population, based on careful clinical examination *plus* laboratory and X-ray findings, they found a prevalence of rheumatoid arthritis of 2·5% for males and 11·0% for females or 7·8% for both sexes combined.

Cobb, Warren, Merchant and Thompson (1957), using the definition of the American Rheumatism Association based on clinical examination and X-ray findings in persons over 15 years of age, obtained an over-all rate of 13·9% definite, possible and probable sufferers from rheumatic diseases, or counting only the definite and probable, 2·7%.

Conclusions and Summary.

In October, 1956, a survey was made to assess the frequency of the rheumatic diseases, one in every five hundred dwellings in Sydney being sampled. Full cooperation was obtained in 87% of the dwellings. In the 967 dwellings, there lived 3264 persons of all age groups, who were fully representative of the complete Sydney population. Of these 3264 persons, a total of 642—279 males and 363 females—were recorded as suffering from rheumatic symptoms during the previous ten months. Some 1·8% of males, 4·5% of females or 3·2% of all persons suffered from symptoms of rheumatoid arthritis: 3·9% of males and 6·0% of females or 5·0% of all persons had symptoms consistent with a diagnosis of osteoarthritis.

Half the invalid pensioners and 48% of those permanently unable to work were suffering from rheumatic complaints. A very conservative cost to industry from time lost by the work force in Australia generally is two million pounds, if the Sydney experience is typical of Australia generally.

The sample was tested in various ways against alternative estimates of certain features such as age, pension rates and so on, and appears to have been a good representative sample.

It is concluded that there may be some losses on the over-all complaint rate, and some inaccuracies in the recording of symptoms due to interviewing technique.

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References.

COBB, S. (1954), "The Determination of the Prevalence of Arthritis, Progress Report, December 1, 1952, to August 12, 1954" (unpublished).

COBB, S., WARREN, J. E., MERCHANT, W. R., and THOMPSON, D. J. (1957), "An Estimate of the Prevalence of Rheumatoid Arthritis", *J. chron. Dis.*, 5: 636.

KELLGREN, J. H., LAWRENCE, J. S., and AITKEN-SWAN, J. (1953), "Rheumatic Complaints in an Urban Community", *Ann. rheum. Dis.*, 12: 5.

KELLGREN, J. H., and LAWRENCE, J. S. (1956), "Rheumatoid Arthritis in a Population Sample", *Ann. rheum. Dis.*, 15: 1.

ACCIDENTAL HÆMORRHAGE—MATERNAL AND FŒTAL RESULTS.[1]

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IN this paper and in a subsequent one by Dr. Glyn White, we propose to analyse the management and outcome of pregnancy in 588 patients who had accidental hæmorrhage in the five-year period ending June 30, 1956, at the Royal Women's Hospital, Melbourne. The present paper will deal with the maternal mortality and morbidity and the fœtal wastage, whilst that of Dr. Glyn White will discuss the clinical features of those babies who were discharged alive from hospital.

Terminology.

Edward Rigby in 1775 first published his monograph on "Uterine Hæmorrhages which Precede the Delivery of the Full Grown Fœtus". In this he differentiated between accidental hæmorrhage and unavoidable hæmorrhage, and he was the first to use these terms. Nowadays unavoidable hæmorrhage is known as placenta prævia; attempts have been made overseas to change the term accidental hæmorrhage to abruptio placentæ or to premature separation of the normally implanted placenta, but these suggested alterations have not proved acceptable in this country. There has, however, been a change in the nomenclature of the various types of accidental hæmorrhage. A decade ago it was customary to use the terms "concealed", "revealed" and "mixed". This was unsatisfactory, as most patients had both concealed and revealed hæmorrhage, and in any case the terms were not descriptive of the clinical condition of the patient. It is well known that the clinical picture in a patient with accidental hæmorrhage can range from no signs and very few symptoms to a severe state of shock. A new classification is now in wide use, in which the clinical condition of the patient is correlated with the amount of placental separation. The following grades are recognized.

Mild Type (Grade I).

The patient will give a history of the loss of a small amount of blood *per vaginam*, with very little or no accompanying pain. Her general condition is excellent, abdominal examination shows no abnormality, and the fœtus is alive. There is usually no albuminuria, and the blood pressure is normal. It is difficult to differentiate between placenta prævia and accidental hæmorrhage as the cause of the ante-partum hæmorrhage in patients with this clinical picture, and unless an examination *per vaginam* is done—and this is most unusual—the diagnosis of accidental hæmorrhage is often not made until after delivery. The degree of placental separation is minimal, and amounts of up to one-quarter of the total area are included.

Moderate Type (Grade II).

There will be a history of bleeding *per vaginam*, accompanied by abdominal pain. The general condition of the patient is good; abdominal examination may reveal a localized area of tenderness, or the whole uterus may be tense and tender. In the first instance, the outline of the fœtus can be discerned, and its heart-sounds probably heard; in the second instance, neither of these findings is likely. Often signs of preeclampsia will be present. On clinical grounds a diagnosis can usually be made, but in some cases a pelvic examination in the operating theatre may be necessary. The amount of placental area separated is between one-quarter and two-thirds. The fœtus cannot survive if more than one-third of the placenta separates at the one time; however, if the separation is gradual, amounts greater than one-third can be separated and the fœtus survive. In this grade it follows that the fœtus may or may not survive according to the amount separated.

Severe Type (Grade III).

In the severe type there will be a history of vaginal bleeding, often small in amount, accompanied by abdominal pain, which is rarely severe. The general condition of the patient is grave, and she will show signs suggesting a total blood loss much greater than what has been lost *per vaginam*. The uterus has a board-like rigidity and is tender. The fœtus cannot be outlined, and the fœtal heart sounds are usually absent. The amount of placental separation exceeds two-thirds of the total area.

Treatment.

The treatment of accidental hæmorrhage at the Royal Women's Hospital is remarkably uniform in the five independent units that exist in the hospital. There is an adequate supply of ante-natal beds, into which patients with ante-partum hæmorrhage can be admitted for assessment and diagnosis. The treatment of individual patients varies according to the clinical findings.

Mild Type.

If the patient is not in labour, treatment is expectant, as often a diagnosis of accidental hæmorrhage is not made initially. An attempt to exclude placenta prævia may be made by placentography, but vaginal examination is not warranted. If the skiagram shows the placenta to be normally situated, and if no further bleeding occurs, the patient can be discharged home in about a week.

If the patient is in labour when the bleeding occurs, treatment is again expectant, but particular attention must be paid to the fœtal heart rate. Vaginal delivery is the usual outcome, but forceps may be used in the second stage of labour to hasten delivery.

Moderate Type.

The aims in treatment are initially to replace blood lost, and subsequently to achieve vaginal delivery. The amount of blood to be replaced seems always greater than one expects. The serum fibrinogen value is estimated, and fibrinogen given as required.

If the patient is in labour, the fœtal heart sounds, if present, should be counted at very frequent intervals. Fœtal distress in the second stage of labour demands delivery by forceps or breech extraction. If fœtal distress occurs in the first stage of labour, delivery by Cæsarean section should be considered, although there will be other factors to take into consideration which will be discussed later. Fœtal distress is rarely seen in this type at the Royal Women's Hospital.

If the patient is not in labour by the time the blood loss has been adequately treated—and it is our experience

[1] Read at a meeting of the Section of Obstetrics and Gynæcology, Australasian Medical Congress (B.M.A.), Tenth Session, Hobart, March 1 to 7, 1958.

that about one-half of the patients in the group fall into this category—the question of induction of labour is then considered. Each unit in the hospital has minor variations of treatment under these circumstances. In our own unit, if the patient does not commence labour spontaneously once the phase of uterine tenseness has passed—and many patients do—rupture of the membranes is performed; if labour does not begin within 12 hours of this, a medical induction with "Pituitrin" is used in addition.

Severe Type.

Treatment again consists of rapid and complete blood replacement followed by vaginal delivery. The fœtus is usually dead, and it is the mother who requires immediate treatment. The amount of blood given by transfusion is rarely sufficient, and it is a good rule to give twice the amount of blood estimated to be necessary. Amounts of five to 10 pints are not unusual. This blood should be administered rapidly, in order that the systolic blood pressure be kept above 100 millimetres of mercury. Fibrinogen is used as required. Morphine (one-quarter of a grain) should be given, and repeated as necessary. Induction of labour rarely has to be considered in these cases because, in many, as soon as the period of tenseness of the uterus has passed, labour begins spontaneously, and is often over in a very short space of time. If labour does not begin, the same principles apply as have been outlined in the treatment of moderate separation.

Summary.

To summarize, the principles of treatment are as follows: (i) replace blood immediately and completely; (ii) note any evidence of hypofibrinogenæmia; (iii) aim for a vaginal delivery; (iv) induce labour if necessary when the period of uterine tenseness has passed; (v) treat fœtal distress if it occurs.

Results.

Maternal.

In the 588 patients under review, there were no maternal deaths, and there have not been any in the eighteen months that have elapsed since the completion of this series. In the five years prior to this review (1946-1951), there were four maternal deaths, and in the five years prior to that (1941-1946), eight occurred. The reduction in the maternal death rate is due to the availability, first, of blood, and secondly of fibrinogen.

In the 588 patients who survived, there were some complications. Oliguria during the phase of shock was common, but once delivery had occurred the urinary output improved. Delay in delivery is associated with an incidence of kidney damage, which is no greater than that noted in reports from centres where early delivery is practised. Two patients had prolonged oliguria during the puerperium, indicating that cortical necrosis of the kidney had occurred. Both of these patients were treated successfully by the "Bull regime", with special emphasis on the respective potassium levels during the oliguric phase and the phase of diuresis. We do not agree that rapid emptying of the uterus is necessary to keep the incidence of this complication low.

Hypofibrinogenæmia was encountered in three patients in the last two years of this five-year period. Prior to this stage failure of the blood to clot was recognized, and its significance was known to be great, but the reason for the phenomenon was not known. Simple measures such as collecting blood and observing whether it clots and whether the clot subsequently dissolves may be used to determine the presence of hypofibrinogenæmia when more elaborate biochemical methods are not available. Fibrinogen is given as required, and this may well be a life-saving measure. However, the incidence of this complication in accidental hæmorrhage is very low when complete and rapid blood replacement is used.

In the present series, there is a reduction in the association of accidental hæmorrhage with eclampsia. In 1951-1952 there were two such cases, in 1952-1953 one, in 1953-1954 three and since then none. There is likewise among booked patients a reduction in the incidence of severe preeclampsia. Despite this, the incidence of accidental hæmorrhage has remained stationary, as seen in Table I. This confirms the belief that preeclampsia is not an important predisposing factor in accidental hæmorrhage. Feeney in 1955 stated that it was so related in only 10% of cases.

Cæsarean section was used in eight cases as the method of delivery. The indication in seven was some factor other than accidental hæmorrhage. In one case there was fœtal distress in the first stage of labour.

The absence of any maternal mortality and the low incidence of complications in the mother show that, as far as the mother is concerned, a vaginal delivery is safe.

TABLE I.

The Incidence of Accidental Hæmorrhage (588 Patients).

Year.	Booked Patients.			Non-Booked Patients.		
	Number of Deliveries.	Number of Accidental Hæmorrhages.	Percentage.	Number of Deliveries.	Number of Accidental Hæmorrhages.	Percentage.
1951–1952 ..	5791	94	1·6	627	51	8
1952–1953 ..	6301	63	1·0	501	52	10
1953–1954 ..	6318	65	1·0	520	27	5
1954–1955 ..	6686	41	0·6	498	59	12
1955–1956 ..	6638	74	1·1	522	62	12
Total ..	31,734	337	1·1	2668	251	10

Note: Booked patients attended the antenatal clinic at least twice during pregnancy; non-booked patients attended the antenatal clinic once or were admitted to hospital as an emergency.

Fœtal.

The use of this conservative method of treatment naturally delays the birth of the fœtus. Table II shows the fœtal mortality for the 588 patients. There were 111 stillbirths and 33 neonatal deaths in the whole group, a wastage of 24%. If the results for booked and for non-booked patients are separated, in booked patients there was a fœtal wastage of 20%; in non-booked patients it was 29%.

Stillbirths.

Of the 111 stillbirths, in 71 cases the fœtal heart sounds were not heard on admission to hospital, leaving only 40 in which fœtal death occurred after admission. Seventeen of these fœtuses were at a maturity of 33 weeks or less at birth, and probably would not have survived had they been born alive. Six had congenital abnormalities, and of the remaining 17, it is considered that Cæsarean section after the patient's admission to hospital might have saved seven of these, and better obstetric care of associated conditions might have saved a further nine. Evidence of fœtal distress was found in only five of the 40.

Neonatal Deaths.

There were 33 neonatal deaths. Of these, 24 were of neonates at a maturity of 33 weeks or less at birth, who were poor risks because of prematurity. Of the remaining nine, three had congenital abnormalities incompatible with extrauterine existence, three might have survived with better obstetric care of some associated condition, and three might have survived if the delivery had been hastened by Cæsarean section.

Discussion.

It is very difficult to anticipate the occurrence of this condition. Two factors only are known to predispose to accidental hæmorrhage, namely preeclampsia and hypertension, but according to Feeney preeclampsia is responsible in only 10% of his series, and high blood pressure in 9%; the remaining 81% had no definite ætiological factor.

TABLE II.
Fœtal Mortality.

Year.	Booked Patients.				Non-Booked Patients.			
	Number of Accidental Hæmorrhages.	Number of Stillbirths.	Number of Neonatal Deaths.	Total.	Number of Accidental Hæmorrhages.	Number of Stillbirths.	Number of Neonatal Deaths.	Total.
1951–1952	95	11	2	13	53	12	4	16
1952–1953	64	11	5	16	52	16	2	18
1953–1954	85	10	4	14	27	7	2	9
1954–1955	42	6	3	9	61	12	1	13
1955–1956	75	15	2	17	63	11	8	19
Total	341 (4 twins)	53	16	69 (20%)	256 (5 twins)	58	17	75 (29%)

No maternal deaths should occur if shock is promptly treated and hypofibrinogenæmia is corrected. Rapid and complete blood replacement with preferably fresh blood will keep the incidence of cortical necrosis of the kidney to a minimum. Cæsarean section is never indicated as a method of treatment for maternal reasons.

Accidental hæmorrhage is a condition seen throughout the third trimester and the late part of the second. This means that the fœtus may be small and, because of its prematurity, have a poor expectation of life. Some of the associated conditions found in patients with accidental hæmorrhage, namely preeclampsia, essential hypertension and placental insufficiency, themselves predispose to a small fœtus, so that often we are dealing with poor fœtal material. In 164 (28%) of the patients, the duration of pregnancy was 33 weeks or less when the accidental hæmorrhage occurred, and only 50% of these babies survived. When the fœtal heart sounds are present on the patient's admission to hospital and the period of gestation is 34 weeks or over, the chance of survival is much better; 95% of these babies survived.

A critical study has been made of the stillbirths and neonatal deaths, special notice being taken as to whether delivery by Cæsarean section for the baby's sake is a worthwhile procedure. Of the 141 babies lost, 10 might have been saved by Cæsarean section, the principal indication being the presence of a live baby of a maturity of 34 weeks or more, combined with evidence of fœtal distress. Such a policy would have led to a Cæsarean section rate of 2%.

The use of the conservative approach in the treatment of accidental hæmorrhage has resulted in a fœtal wastage of 20% in booked patients. This compares favourably with recent overseas publications, in which Cæsarean section has been advocated as a method of treatment to reduce fœtal wastage, many of them reporting a Cæsarean section rate of 20% or more. The present series shows that comparable fœtal figures can be obtained with a negligible Cæsarean section rate.

Another aspect of the problem must be analysed, and that concerns the infant who survives. Does the prolonged period of hypoxia which the fœtus undergoes *in utero* during such conservative treatment have any remote after-effects in the child? Dr. Glyn White will deal with this matter.

Summary.

1. During the five-year period 1951-1956, 588 patients with accidental hæmorrhage were treated at the Royal Women's Hospital, Melbourne.

2. Accidental hæmorrhage is now classified in some overseas clinics according to the clinical condition of the patient and the amount of placental separation that has occurred. This division into three grades is discussed and recommended.

3. Treatment of the three grades is outlined as follows: (a) In the moderate and severe types, rapid and complete blood replenishment is the major line of treatment. (b) Hypofibrinogenæmia is treated by the administration of fibrinogen. (c) A vaginal delivery is preferable. (d) Labour is induced when the period of uterine tenseness has passed.

4. No maternal deaths occurred, and the incidence of oliguria and hypofibrinogenæmia was low.

5. There is no maternal indication for Cæsarean section in the treatment of accidental hæmorrhage.

6. Cæsarean section was performed on eight patients in the series, only one being for fœtal distress due to accidental hæmorrhage and seven for other indications.

7. The fœtal wastage in the whole series was 24%. In booked patients it was 20%, and in non-booked patients it was 29%. The fœtal wastage in booked patients compares favourably with that in other published series, in which Cæsarean section is used quite often for fœtal indications.

8. Of the 144 babies lost, 71 were lost before the mothers' admission to hospital.

9. Earlier delivery by Cæsarean section might have saved 10 babies, and better obstetric care 12 babies.

10. In 28% of the patients, the duration of the pregnancy was 33 weeks or less when the accidental hæmorrhage occurred. Only 50% of these babies survived, and it is doubtful if more rapid delivery by Cæsarean section would have improved these figures. In the 72% of patients whose gestation was 34 weeks or more, 95% of the babies survived, and it is in this group that the salvage rate may be further improved by the use of Cæsarean section when fœtal distress occurs. Five cases of fœtal distress occurred in the series, an incidence of 1%.

Acknowledgement.

I wish to thank my colleagues of the honorary obstetrical staff of the Royal Women's Hospital for the use of clinical material from their units to prepare this paper.

Reference.

FERGUSON, J. K. (1955), "Accidental Hæmorrhage", *Irish J. M. Sc.*, 353: 195.

ACCIDENTAL HÆMORRHAGE—PÆDIATRIC FOLLOW UP.[1]

By J. GLYN WHITE,
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As Professor Lance Townsend has informed you, accidental hæmorrhage occurred in 588 patients at the Royal Women's Hospital, Melbourne, during the five-year period ending June 30, 1956. There were 111 stillbirths and 33 neonatal deaths, leaving a total of 444 babies who were discharged from hospital, and 226 (51%) of these were reviewed. Of these 226, 211 were considered to be

[1] Read at a meeting of the Section of Obstetrics and Gynæcology, Australasian Medical Congress (B.M.A.), Tenth Session, Hobart, March 1 to 7, 1959.

within normal limits, seven were definitely abnormal and eight were classified as "doubtful" babies. The remaining 49% could not be traced. Of the seven abnormal infants, the abnormality in five was attributable to accidental hæmorrhage; in one the abnormality (spastic quadriplegia) was the result of encephalitis at the age of ten and a half months, and the other infant died at 23 months from multiple congenital abnormalities (congenital heart disease, harelip and cleft palate, absent ear). These last two were excluded, as their condition was not directly due to accidental hæmorrhage. Of the other five abnormal babies, one was mentally retarded, one was an epileptic and mentally retarded, one had a "tremor" type of cerebral palsy, one had a spastic diplegia, and one had a hemiplegia. None of the eight "doubtful" babies showed any signs of locomotor disability, but all presented with evidence of possible brain damage as manifested by convulsions, breath-holding attacks, behaviour problems, delayed speech and speech defects. To summarize, 13 children (5·8%) of the number reviewed showed evidence of brain damage or suspected brain damage.

Age Groups.

A study of the age groups of the 226 children reviewed revealed that 59 or 26·6% (including two abnormal babies and one "doubtful" baby) were in the five to six year age group; 46 or 20% (including two abnormal babies and two "doubtful" babies) were in the four to five year age group; 35 or 15·4% (including two "doubtful" babies) were in the three to four year age group; 53 or 23·4% (including two "doubtful" babies) were in the two to three year age group; 33 or 14·6% (including one abnormal baby and one "doubtful" baby) were in the one to two year age group.

I would like to point out, at this juncture, that this paper is in the nature of an interim report, as quite a high percentage of the children reviewed were too young for an estimation of their mental capabilities to be made.

Gestational Age.

The gestational age of the babies reviewed is shown in Table I.

TABLE I.

Gestational Age of the Babies Reviewed.

Gestational Age. (Weeks.)	Babies Reviewed.		
	Number.	Percentage of Total Reviewed.	Number of Abnormal and "Doubtful" Babies.
28 to 30	5	2·2	—
30 to 32	25	11·1	6
32 to 34	27	11·9	2
34 to 36	28	12·4	—
36 to 38	39	17·2	—
38 to term	102	45·2	5
Total ..	226	100·0	13

A study of Table I suggests that prematurity may have been the major ætiological factor in the causation of the infant morbidity, as 20% of the babies of a gestational age under 32 weeks showed some evidence of brain damage, whereas, of those who had a gestational age of over 32 weeks, only 3·6% were regarded as being abnormal.

Results in the Group of Mothers who Required Blood Transfusion.

It might have been anticipated that the incidence of infant morbidity would be higher in the group of mothers who required blood transfusion, but such was not the case. Of the 160 mothers who were given blood transfusions, the fœtal mortality was 80 (50%), and 80 of the babies left hospital. Of the 80 who left hospital, 40 attended for review, and in only one was there evidence of brain damage. This child had a severe degree of stammer.

In order to ascertain whether there was any evidence during labour or the neonatal period which would be of prognostic value, the labour ward charts and neonatal histories of the abnormal and "doubtful" babies were reviewed. Close study of the labour ward charts by Professor Townsend failed to reveal any evidence of fœtal distress, as judged by present-day standards.

Table II gives the neonatal notes concerning the abnormal and "doubtful" babies.

TABLE II.

Neonatal Notes on the Abnormal and "Doubtful" Babies.

Abnormality.	Neonatal Notes.	Birth Weight.
Mental retardation.	30 weeks' gestation; cried in 30 seconds; quite jaundiced on the third day.	lb. oz. 2 15
Mental retardation with epilepsy.	Delivered at term; nothing abnormal noted.	9 2
Tremor type of cerebral palsy.	38 weeks' gestation; an apparently healthy baby.	5 7
Hemiplegia.	30 weeks' gestation; cyanosed at birth; 35 minutes before rhythmic breathing was established.	4 0
Spastic diplegia.	31 weeks' gestation; condition at birth fair; recurrent cyanotic attacks in first 48 hours; simple blood transfusion at nine weeks.	3 0

The neonatal charts of the eight "doubtful" babies showed that four were regarded as quite normal, and four had cyanotic attacks during the first 72 hours of life (it is interesting to note that these four were all in the gestational age of 30 to 32 weeks).

Conclusion.

It is obvious that accidental hæmorrhage is a potent cause of fœtal wastage and infant morbidity, and until the problem is solved the pædiatrician's task of salvaging, to the maximum extent, the "accidental" neonate remains. As there seem to be all grades of damage to the fœtus in this condition, from fatal to severe to slight to apparently nil, it appears that there must be a percentage of babies in whom the intrauterine anoxia may cause a "reversible" damage to cells of the central nervous system, and if by adequate management further anoxia in the neonatal period can be prevented, then the damage is reversed. If, on the other hand, further anoxia occurs, then the hitherto "reversible" damage becomes "irreversible", and a neonatal death or a child with a damaged brain results.

PROLONGED PREGNANCY—ITS HAZARDS AND MANAGEMENT.[1]

By IAN COPE, F.R.C.S., M.R.C.O.G.,

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Hurry is bad and delay also is often bad; Raw Haste is half-sister to Delay.—BALLANTYNE (1902).

EARLY in the eighteenth century, from when we date modern obstetrics, Mauriceau (1739) and Smellie (1752) were writing about the increased dangers associated with prolonged pregnancy. Isolated cases were recorded, but very little knowledge was added until the nineteenth century, when statistical evidence about the duration of pregnancy was brought forward by Merriman (1827), Murphy (1847) and Reid (1850).

[1] The material presented in this paper forms part of a study of certain aspects of prolonged pregnancy, which has been submitted for consideration to the University of Sydney for the degree of doctor of medicine.

During the last three decades, more intensive research has been carried out into the effects of prolongation of pregnancy, with special regard to the hazards involved both to the mother and to the fœtus.

Prolongation is one of the two extremes in the duration of pregnancy. The importance and dangers of prematurity are widely accepted, and premature intrauterine death or premature delivery of an infant too young to survive are still the greatest problems in obstetrics. The causal factors are ill understood, but much research is in progress. The causes of prolonged pregnancy are unknown, and until they are discovered, the management of patients whose pregnancies are prolonged remains empirical. Whether this means admission to hospital for close observation or a ride in a T-model "Ford", as Hellman (1956) once advised, management is as yet not on a rational basis.

The hazards to which mother and infant are subjected when pregnancy is prolonged are considered, in some clinics, to be so great as to necessitate routine surgical induction of labour at a specified time beyond the expected date, while in others the risks are thought to be so small that they can be ignored. As no large series has been examined in an Australian population, the writer carried out, in 1952-1953, a clinical survey at the Royal Hospital for Women, Paddington, Sydney, of the incidence, complications and hazards to the mother and the fœtus of prolonged pregnancy. After this, further investigations were carried out to study maternal plasma and blood volume changes in late and prolonged pregnancy, to assess certain methods used frequently in the recognition of prolonged pregnancy, and to study the results of an increasing use of surgical induction of labour for prolonged pregnancy and suspected placental insufficiency. These were carried out at the Institute of Obstetrics and Gynæcology, Hammersmith Postgraduate Hospital, University of London. The results of the clinical survey at the Royal Hospital for Women, Sydney, and the results of surgical induction of labour for prolonged pregnancy at Hammersmith Hospital, London, are presented and discussed.

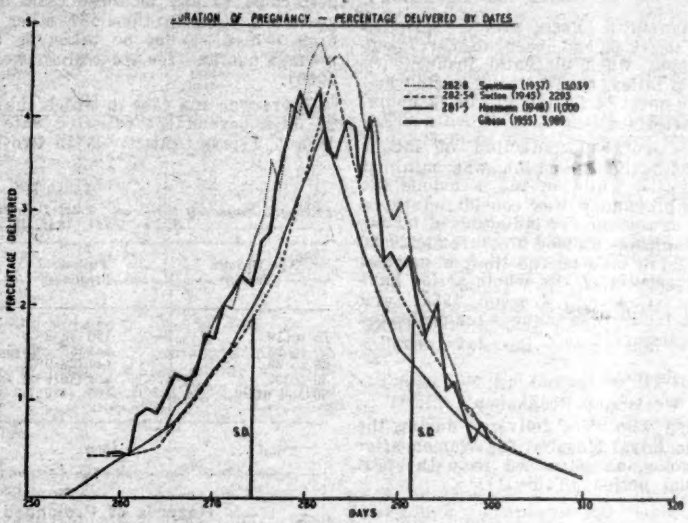

FIGURE I.

Duration of pregnancy—percentage delivered by dates.

NORMAL DURATION OF PREGNANCY.

The statement "prolonged pregnancy" implies that there is a limit of normal pregnancy. However, there has never been a universally accepted limit to which pregnancy can be prolonged. Reid (1850) gives an excellent historical review up to that time, and presents a series of normal deliveries showing the variability of the duration of pregnancy. Since then, many large series of deliveries have been examined to ascertain the average duration of pregnancy and its variability. Four of these studies are presented in Figure I.

Among Australian populations, two observations have been made. Robertson (1915), in Adelaide, found that the average period of gestation, from the first day of the last menstrual period, of 247 male infants was 282·5 days with a standard deviation of 17·2 days, and of 264 female infants was 284·5 days, with a standard deviation of 13·2 days. All infants stated to be suffering at birth from syphilitic infections or deformities and all infants who died within one week of delivery were excluded. D. Harvey Sutton (1950) found that the median of 13,660 natural single births in Sydney was 282·53 days. This excluded deliveries outside the limits of 251 and 313 days. The minor variations in the results reported in Australia and overseas may be due, in some measure, to the exclusion of different groups from the observations. The average period of gestation as observed in Sydney in 1950 is virtually the same as that estimated by Merriman in 1827.

Many factors, of course, are known to influence the duration of a particular pregnancy. Gunn *et alii* (1937), studying the variations in menstrual cycles, found that 78% fell between 25 and 31 days, and that the woman with the most regular cycle had a range of two and three-quarters days. Collett *et alii* (1954) studied the ovulation times and the duration of the luteal phase, using basal temperature charts. They again found considerable variations. They found that 15% of cycles were anovulatory, and in the majority of the cycles at all ages ovulation took place 10 to 18 days from the first day of the last menstrual period. The luteal phase also varied considerably, being 10 to 18 days in 75% to 95%, when all cycles in women between the ages of 20 and 50 years were considered.

Karn and Penrose (1951-1952) found that the mean gestation times for mothers aged under 32 years were a day or two longer than for those aged 32 and over. This longer gestation time in younger women would be consistent with the longer menstrual cycles in younger women, in whom presumably the date of ovulation is later.

Robertson (1915) and Karn and Penrose (1951-1952) both found that the mean gestation time for female infants was longer than for males. This difference may be due to the production of œstrogens and progesterone by the female *in utero*.

Other factors, such as heredity (Meyer, 1915) and emotional factors (Muller, 1954), are also considered to influence the gestation time.

When so many factors are known to influence the gestation time, considerable latitude must be allowed when one is considering the limit of normal pregnancy and deciding whether a particular pregnancy has been prolonged. In this series, only pregnancies which had proceeded beyond the 296th day from the first day of the last menstrual period were considered to be prolonged.

METHOD OF STUDY.

The records of all women who were delivered at the Royal Hospital for Women, Sydney, 297 or more days after the first day of the last menstrual period between 1947 and 1952 were examined. The names of the patients were obtained from the hospital register of births, and the case records were extracted and examined. Where there was gross menstrual irregularity or uncertainty of the date of the last menstrual period, the case was excluded from the series. This involved reference to the 2013 case histories, of which 463 were discarded for the

reasons given. The total number of deliveries surveyed was 19,475.

The features of these 1550 cases were studied and compared with the total deliveries for 1947, 1948 and 1949. (Reports for 1950, 1951 and 1952 were not available.)

The records of all stillbirths and neonatal deaths during the same six-year period were examined, and an attempt was made from the clinical and post-mortem findings to determine the cause of death in each case. When no definite cause was found, the case records were scrutinized especially to determine the duration of pregnancy when the fœtus died. The relative risk to the fœtus of asphyxia of undetermined cause was assessed for different durations of pregnancy.

The policy at Hammersmith Postgraduate Hospital during the years 1951 to 1956 had been to carry out surgical induction of labour when placental insufficiency was suspected, and if this failed, even after "Pitocin" had been given, to lead to the onset of labour within 72 hours, Cæsarean section was performed.

The increasing use of surgical induction of labour meant that in many cases the indication was minimal hypertension or preeclampsia, while on 155 occasions the indication was that the pregnancy was considered to be prolonged and there was at the time of induction of labour no hypertension or preeclampsia (a blood pressure of 120/80 millimetres of mercury being used as the limit of normal in pregnancy). Certain aspects of the whole series have been discussed elsewhere (Cope and Pearson, 1958), and only those cases in which labour was induced for prolonged pregnancy alone will be discussed.

RESULTS.

Incidence of Prolonged Pregnancy.

There were 1550 women who were delivered during the years 1947 to 1952 at the Royal Hospital for Women after the 296th day of pregnancy, as estimated from the first day of the last menstrual period (Table I).

TABLE I.

Incidence of Prolonged Pregnancy, Royal Hospital for Women, Sydney, 1947 to 1952

Duration of Amenorrhœa. (Days.)	Group I. (Booked before 24 Weeks.)	Group II. (Booked after 24 Weeks and Emergency.)	Total.	Percentage of Total Deliveries.
297 to 301 ..	503	106	609	3·1
302 to 308 ..	356	104	460	2·45
309 to 315 ..	199	59	258	1·3
316 to 322 ..	104	22	126	0·65
323 and over ..	68	29	97	0·5
Total	1230 (6·3%)	320	1550	8·0

There were 1230 cases (Group I) in which the patient was examined in the first 24 weeks of pregnancy, and 320 (Group II) in which the patient attended late in pregnancy for the first time, or whose admission to hospital was an emergency. (Emergencies accounted for 96 cases.) During the period 297-301 days, 3·1% were delivered, and during the week 302 to 308 days, a further 2·45%. Of those confined more than 296 days after the first day of the last menstrual period, there were 13 cases in Group I in which the duration of pregnancy exceeded 322 days. The longest duration was 338 days.

Relationship Between Prolonged Pregnancy and Age and Parity.

Maternal Age.

There was a higher incidence of prolonged pregnancy in the younger age groups (Table II). This is more apparent than real, because of the higher rate of induction of labour in older women and the slightly longer menstrual cycles in the younger women.

Parity.

There was no significant difference in the parity of the patients with prolonged pregnancies and the total deliveries for the years 1947, 1948 and 1949. Of the women who had prolonged pregnancies, 41% were primigravidæ, while of the total number in the years 1947-1948-1949, 39·2% were primigravidæ.

Relationship Between the Periods of Gestation of Siblings.

The records of 77 cases were available for study in which one pregnancy had been prolonged and there also had been another pregnancy. No inductions of labour were performed in any of these cases. The average apparent gestation time in these 77 other pregnancies was 281·8 days, which cannot be taken as any different from the normal average for Australian women of 282·55 (Sutton, 1950).

There was one case in which the duration was prolonged 21 days beyond the expected date in one pregnancy and 16 and 9 days respectively in two subsequent pregnancies.

TABLE II

Prolonged Pregnancy Series and Total Deliveries, Royal Hospital for Women, Sydney (1947, 1948, 1949) by Age.

Age Groups. (Years.)	Prolonged Pregnancy	Total Deliveries.
15 to 19	190 (12·2%)	907 (9·6%)
20 to 24	544 (35·1%)	3298 (34·9%)
25 to 29	447 (28·9%)	2712 (28·8%)
30 to 35	261 (16·9%)	1736 (18·4%)
36 and over ..	108 (6·9%)	780 (8·3%)
Total	1550	9433

Hazards of Prolonged Pregnancy.

Maternal Mortality.

There were three maternal deaths in this series of 1550 cases, two from eclampsia and the other from a bronchogenic carcinoma. All patients died in the puerperium.

Assessment of Difficulties at Delivery.

Birth Weight and Cephalopelvic Disproportion.

An examination of the birth weights in this series shows that the average birth weight of 1000 infants delivered after the 296th day was eight pounds two ounces, whilst a sample of 200 merely mature babies (delivered between 273 and 287 days) had an average birth weight of seven pounds eight ounces. The difference in these figures is statistically significant. However, 75 of the 1230 babies in Group I (Table I) weighed less than six and one-half pounds at birth.

Cæsarean Section.

Among the 1550 cases of prolonged pregnancy, 33 Cæsarean sections were performed; the Cæsarean section rate was 2·3%, 11 of the operations being performed for disproportion. Seven others were performed for malpresentation (brow and breech), and five for uterine inertia. During the period 1947-1948-1949, 210 Cæsarean sections were performed, a rate of 2·3%. The indication for 50 of these was disproportion—that is, 23·7% of the total rate. It would appear that although the Cæsarean section rate in the prolonged pregnancy group was the same as that in the total group, there was a slightly, but not significantly, increased Cæsarean section rate due to disproportion in this series.

Instrumental Delivery Rate, with Consideration of the Incidence of Fœtal Distress.

The instrumental delivery rate in this series was 14·9%. Fœtal distress was the indication for interference in 6·6% of the cases.

During the period 1947-1948-1949 there were 9433 deliveries, and 1009 of these were instrumental, a rate of

10·6%. In 275 of these deliveries the indication for the interference was fœtal distress; this gives an instrumental delivery rate for fœtal distress of 3·1%. The differences in the forceps delivery rates for fœtal distress are statistically significant.

An analysis of the forceps delivery rates for pregnancies of different duration beyond the 296th day gives no indication that there is a critical duration of pregnancy when fœtal distress develops before the 316th day (Table III).

TABLE III.

Instrumental Delivery Rate (Post-Maturity, Public Wards), Royal Hospital for Women, Sydney.

Duration of Pregnancy. (Days.)	Number of Cases.	Instrumental Delivery.	Total Rate.	Instrumental Delivery, Fœtal Distress.	Fœtal Distress Rate.
297 to 301 ..	609	97	15·9%	39	6·4%
302 to 308 ..	460	64	14·0%	28	6·1%
309 to 315 ..	258	28	10·9%	16	6·2%
316 to 322 ..	126	27	21·5%	13	10·3%
More than 322	97	14	14·5%	7	7·2%
Total ..	1550	230	14·9%	103	6·6%

Prolonged Labour.

There was an increased incidence of prolonged labour in this series. There were 41 women whose labour was prolonged beyond 36 hours, an incidence of 2·6%. The incidence of prolonged labour for the total deliveries (1947-1948-1949) was 0·8%.

Stillbirths and Neonatal Deaths in Prolonged Pregnancy.

There were 29 intra-partum stillbirths—four from cerebral hæmorrhage following a tentorial tear, and 25 from asphyxia (eight being associated with a well-defined cause). There were no stillbirths in this group due to congenital abnormalities or hæmolytic disease.

There were 23 ante-partum deaths. Of these, two occurred before the 297th day and have been transferred from the "prolonged pregnancy" to the "mature" group. In the majority of cases, complicating factors such as mild hypertension (a blood pressure of 120/80 millimetres of mercury being used as a standard) or pre-eclamptic toxæmia were present.

The stillbirth rate in the prolonged pregnancy group was 31·5 per 1000 births.

During the period 1947 to 1952, there were 445 stillbirths among the 19,475 deliveries, a total stillbirth rate of 22·8 per 1000 total births. If cases of prematurity (142) and prolonged pregnancy are omitted, the stillbirth rate of the mature group, approximately 17,000 (estimated from Sutton's figures), is 14.0 per 1000 births.

The difference between the stillbirth rates for the "mature" and "prolonged pregnancy" groups is statistically significant.

The probable date of ante-partum death was estimated in nine cases. If these and the intrapartum deaths are grouped against duration of pregnancy, the stillbirth rates for different durations of pregnancy beyond 296 days can be determined. Although the stillbirth rate was increased slightly in the more prolonged pregnancies, and increased from 1·8% in the 297 to 301 days group to 3·3% in the 302 to 308 days group, this increase in the stillbirth rate was not progressive after the 308th day and remained about 3·1% for the other more advanced groups (Table IV).

There were 12 neonatal deaths. Three were due to congenital abnormalities (one from hydrocephalus, one from microcephalus and one from atresia of the ileum). There was one death due to hæmolytic disease of the new-born, and two were due to tentorial tears and cerebral hæmorrhage. The other six deaths were caused by atelectasis and/or bronchopneumonia; one was associated with placenta prævia, one with primary uterine inertia and one with Cæsarean section.

The other three neonatal deaths (pregnancies of 299, 301 and 303 days' duration) were unexplained.

Analysis of Stillbirths and Neonatal Deaths by Maternal Age and Parity.

The analysis of stillbirths and neonatal deaths by age and parity shows clearly the increasing risk with increasing age in both groups (Table V).

In the multigravid group there were one case of hæmolytic disease and three cases of congenital abnormalities. There were also two stillbirths from cerebral hæmorrhage following internal version and breech extraction.

Analysis of the Causes of All Stillbirths and Neonatal Deaths from 1947 to 1952 with Special Reference to Fœtal Asphyxia.

The causes of the 445 stillbirths and 378 neonatal deaths were assessed and are presented in Table VI.

A total of 123 deaths of mature fœtuses and neonates were due to unexplained asphyxia. These have been grouped in relation to duration of pregnancy (Table VII).

About 50% of pregnancies end within one week of the mean (Sutton, 1954). If these figures are used, 25% in the 39th and 40th weeks, 15% in the 38th and 41st weeks, 5% in the 37th and 42nd weeks, 3·5% in the 43rd week and 1·5% after the 43rd week—an estimate of the combined stillbirth and neonatal death rate due to asphyxia of undetermined cause can be ascertained, and is presented in Figure II. This shows that the mortality rate is lowest at term, doubles in the 41st and 42nd weeks, is about 10 times that of term in the 43rd week and rises steeply after that.

Other Features and Complications of Prolonged Pregnancy.

Multiple Pregnancy.

There were three twin pregnancies in this series. The duration of pregnancy in these cases was 297, 298 and 313 days respectively. The birth weights of the infants were between five pounds six ounces and six pounds fourteen and one-half ounces. In one case, both twins died *in utero*. This was thought to be due to asphyxia associated with uterine inertia and drainage of liquor.

TABLE IV.

Stillbirths in Prolonged Pregnancy Series by Weeks, Royal Hospital for Women, Sydney.

Duration of Pregnancy. (Days.)	Group I. (Patient Examined in First Twenty-four Weeks.)			Group II.			Combined Total.
	Fœtus Stillborn.	Fœtus Macerated.	Total.	Fœtus Stillborn.	Fœtus Macerated.	Total.	
297 to 301	4	3	7 (1·4%)	2	—	2	9 (1·8%)
302 to 308	12	1	13 (3·7%)	4	1	5	18 (3·3%)
309 to 315	3	2	5 (2·5%)	—	1	1	6 (2·3%)
316 to 322	1	3	4 (3·8%)	—	—	—	4 (3·2%)
More than 322 ..	3	—	3 (4·4%)	—	—	—	3 (3·1%)

Malpresentations.

There were 26 cases of breech presentation, an incidence of 1·6%, compared with a total incidence of 3·4%. If breech deliveries of premature infants are excluded, the incidence in the total group (1947-1948-1949) is 1·5%. Four infants were lost, three from anoxia and one from hydrocephalus. The anoxia in two cases was related to twin pregnancies and prolonged labour.

The method of delivery was assisted breech delivery in 18 cases, four patients were delivered by Cæsarean section and four patients required breech extraction, three for prolonged labour and one for prolapsed cord. Three infants suffered nerve or bone injuries which recovered satisfactorily.

TABLE V.

Stillbirths and Neonatal Deaths in the Prolonged Pregnancy Study by Age and Parity, Royal Hospital for Women, Sydney.

62 Cases.

Age. (Years.)	Primigravidæ.		Multigravidæ.	
	Number.	Rate per Thousand.	Number.	Rate per Thousand.
15 to 19	5	31	—	—
20 to 24	12	42	5	19
25 to 29	8	62	10	31
30 to 35	5[1]	103	7	33
36 and over ..	1	70	9	95
Total	31	49	31	34

[1] Twin pregnancy.

There were six cases of oblique lie; this was treated by internal version and breech extraction. In two cases the infant died from a cerebral hæmorrhage and tentorial tear. The incidence of this complication was higher than in the total deliveries.

TABLE VI.

Analysis of 445 Stillbirths and 377 Neonatal Deaths at the Royal Hospital for Women, Sydney, 1947 to 1953.

Cause of Death.	Ante-partum Deaths.	Intra-partum Deaths.	Neonatal Deaths.	Total.
Prematurity, cause unknown	35	107	275	417
Congenital abnormality ..	—	13	24	37
Hæmolytic disease	5	7	8	20
Toxæmia (mother's blood pressure 140/90 millimetres of mercury)	9	18	4	31
Antepartum hæmorrhage ..	7	29	2	38
Accidents of labour:				
Cerebral hæmorrhage ..	—	34	19	} 134
Prolapsed cord	2	16	—	
Other	—	50	13	
Mature fœtus, cause of death unknown	43	59	21	123
Others: diabetes, syphilis, etc.	6	5	12	23
Total	107	338	378	823

Face and brow presentation occurred on six occasions. This incidence is higher than might have been expected.

Complications of Pregnancy.

There were five cases of eclampsia. Two hundred and three patients developed hypertension (blood pressure of 140/90 millimetres of mercury) or pre-eclampsia, an incidence of 13·1%. The incidence in the total deliveries (1947-1948-1949) was 16·7%.

There were 25 cases of antepartum hæmorrhage, of which eight were proven to be due to placenta prævia. The incidence of antepartum hæmorrhage (1·6%) was approximately the same as that in the total deliveries (1947-1948-1949)—1·7%.

Other associated diseases did not occur more frequently in this series of prolonged pregnancies.

Other Complications of Labour.

Surgical induction of labour was performed on 83 occasions. The methods used were artificial rupture of the membranes in 40 cases, stripping of the membranes in 40 cases, and the use of tents, bougies and Willett's scalp traction in the remaining three cases. The incidence of 5·4% was about the same as that in the total deliveries, 5·2%.

TABLE VII.

Analysis of Unexplained Stillbirths and Neonatal Deaths by Duration of Pregnancy, 1947 to 1952.

Weeks of Pregnancy.	Number of Fœtal Deaths.[1]
Less than 37	14
37	5
38	9
39	10
40	15
41	17
42	10
43	13
More than 43	12
Uncertain	18

[1] Macerated fœtuses were grouped in respect to the probable date of fœtal death.

Impacted shoulders occurred on six occasions.

Post-partum hæmorrhage occurred more frequently than in the total deliveries, in 6·4% (99) cases compared with 4·0% of the total deliveries (1947-1948-1949).

Manual removal of the placenta was performed on 32 occasions, an incidence slightly higher than in the total deliveries.

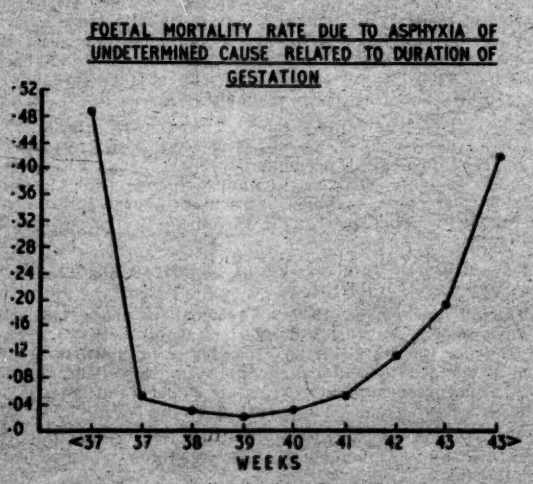

FIGURE II.

Fœtal mortality rate due to asphyxia of undetermined cause related to duration of gestation.

Results of Surgical Induction of Labour for Prolonged Pregnancy Alone.

During the period 1951-1956 at Hammersmith Hospital, London, surgical induction of labour was carried out on 155 occasions because the pregnancy was considered to be prolonged. In these cases, no hypertension (blood pressure 120/80 millimetres of mercury) or pre-eclampsia was evident at the time of induction of labour. In a few cases diminished pelvic measurements were an associated indication for the induction, but the majority were uncomplicated pregnancies.

The average duration of pregnancy when the induction was carried out was 297·3 days, and the range was 280 to 313 days.

The inductions of labour were carried out on 73 primigravidæ and 82 multigravidæ. Where the condition of the cervix was recorded, it was ripe, or dilated to admit more than two fingers, in 74% of the cases.

The duration of labour (excluding the cases in which Cæsarean section was carried out before its onset) was more than 24 hours in 17 primigravidæ and four multigravidæ, out of 65 primigravidæ and 78 multigravidæ.

Cæsarean section was carried out on 23 occasions. The indication was fœtal distress in eight cases, and in the others the indications were delay in the onset of labour and uterine inertia.

Fœtal distress was present on 17 occasions. Instrumental delivery was carried out on 10 occasions, an incidence of 6·4%.

There were three stillbirths and one neonatal death. The cause of the stillbirths was unexplained asphyxia during the first stage of labour. The fœtal heart beat disappeared 4, 23 and 42 hours after surgical induction of labour. The neonatal death, 14 hours after delivery, was due to congenital heart disease.

The average weight of the infants in this series was 7·54 pounds, while a sample of 134 mature infants was 6·95 pounds, a difference of 0·59 pound (9·4 ounces).

Discussion.

Prolonged pregnancy has certain well-defined features affecting a small though significant group of the total deliveries. The incidence of 8% beyond the 296th day (two weeks beyond the expected date of delivery as calculated in Sydney) agrees with that found by other observers (McKiddie, 1949; Sutton, 1950; Clifford *et alii*, 1951; McKeown and Gibson, 1952; Walker, 1954; Gibson 1955). Of the cases observed in the first half of pregnancy, only 13 exceeded 322 days, and the longest accepted was 338 days. The longest period of gestation recorded in which a normal living infant resulted is that of Tausch (1933), 343 days, and in this case the patient was not examined until late in pregnancy. Of course, prolonged pregnancies up to 389 days have been recorded associated with anencephaly (Higgins, 1954) and intrauterine death. It is thought that if a healthy child could result from a pregnancy of more than 338 days, such an instance would have been found in this large series of deliveries.

No correlation was found between prolonged pregnancy and age and parity of the mother. This is in agreement with the observations of Clayton (1953). Although isolated cases have been recorded in which a woman has had several prolonged pregnancies, no correlation was found between the duration of one pregnancy and that of subsequent pregnancies in the large number of cases examined in this series.

Many cases of prolonged pregnancy do not involve any special difficulty or greater risk than pregnancies of normal duration. Sometimes there are difficulties at delivery. This has been recognized for many years, and until the end of the nineteenth century the increased size of the infant was considered to be the only problem associated with these deliveries. Hirst (1892), Sprenkel (1896) and McKerron (1907) were among the first to note in their writings that intrauterine deaths occurred when pregnancy which was otherwise normal was prolonged, and the increased stillbirth rate has been confirmed in the present large series and in series surveyed by Clayton (1941), Rathbun (1943), Solth (1948), von Ruette (1949), McKiddie (1949), Hosemann (1949), Bøe (1950), Gibberd (1952), Walker (1954), Hellman (1956), Higgins (1956), Strand (1956), Lindell (1956) and Kolonja (1956). Even when these reports were published, many people disregarded them because of the small number of deaths involved in a large number of deliveries, and because of the difficulty in recognizing prolonged pregnancy.

Whether the increased stillbirth rate is due to the increased mechanical difficulty at delivery, or to decreasing placental efficiency with increasing fœtal anoxia, this small group of healthy mature babies will continue to be lost unless, by judicious interference, measures are brought about to deliver those in danger at an earlier period.

This series shows that there are increased difficulties at delivery, and also that the risk of fœtal death from "unexplained" anoxia increases significantly after the 40th week. This agrees with the observations made by Hosemann and Massenback (1949), Walker (1954) and Kloosterman (1956).

The fact that stillbirths are "unexplained" requires further consideration. By definition in hospital statistics, levels of raised blood pressure between 120/80 and 140/90 millimetres of mercury are not recorded as hypertension or preeclampsia. In many of the cases of "unexplained" stillbirth, hypertension and preeclampsia might have been suspected in the borderline region of 120/80 to 140/90 millimetres of mercury and might well have been the main factor in the placental insufficiency in these cases. If the standard 120/80 millimetres of mercury is accepted, only one fœtal death remains unexplained in this series. However, if a standard of 140/90 millimetres of mercury is accepted, over half of the 50 stillbirths are unexplained. McClure Browne (1957) has shown that a higher fœtal loss occurred in this mildly hypertensive group than in the group with blood pressures over 140/90 millimetres of mercury, in which more active measures such as early induction of labour were undertaken.

The finding of an increasing stillbirth rate after term must be placed in its true perspective. In total, only 62 out of 1550 infants were lost in this series after the 296th day. However, the attitude in present-day obstetrics is not to look complacently on this 3% fœtal loss and say: "Look at these results, a 97% survival rate in this group at so-called great risk!"; but "To lose any infant beyond term is a tragedy, why have these babies been lost, and how can they be saved?"

The risk to the fœtus increases with maternal age. This has been shown in this series, and agrees with the observation of Walker (1954). The risk to the fœtus is greater in primigravidæ than in multigravidæ, although in this series, trauma associated with internal version and breech extraction of a large fœtus has increased the dangers to the fœtuses of multiparæ.

It is significant that, almost without exception, some other complication of pregnancy was present in the cases in which stillbirth occurred, if mild hypertension (blood pressures between 120/80 and 140/90 millimetres of mercury) is included. Walker (1954) has shown that infants delivered of women who have had hypertension, preeclampsia or hæmorrhage during pregnancy have a lowered oxygen content in their blood. Although the fall in the oxygen content may occur in most cases of prolonged pregnancies, it would appear that the infants delivered of women whose blood pressures have remained below 120/80 millimetres of mercury are at very little risk.

The results of surgical induction of labour for prolonged pregnancy alone at Hammersmith Postgraduate Hospital, London, show that, despite induction of labour, there were three stillbirths and one neonatal death in 155 cases. The three stillbirths occurred without warning and gave a fœtal loss which was only slightly less than would be expected if inductions of labour had not been carried out.

Associated with this were high Cæsarean section and high fœtal distress rates. Cope and Pearson (1958), in their series of inductions of labour, found that only slight reduction in the over-all stillbirth and neonatal death rate could be expected by doubling the rate of induction of labour. Gibberd (1958), in his recent analysis, considered that in post-maturity, artificial rupture of the membranes carried with it dangers to the fœtus that were considerably greater than those which the interference was designed to circumvent.

If a safe method of induction of labour was available, this would be carried out in all cases; but until this has been discovered, induction of labour must remain selective.

Induction of labour in women without hypertension (a blood pressure of 120/80 millimetres of mercury being

taken as the standard) is not indicated from the results of this investigation. The young woman with a prolonged normal pregnancy should be reassured that, as long as no complication appears in the pregnancy, the chances of a living child are as great as they would be if she was delivered at 40 weeks. This does not mean that fœtal distress or other difficulties at delivery will be avoided.

The older woman, who may be more anxious about her pregnancy, will be more apt to have mild hypertension, and will be more willing to undergo the 10% to 15% risk of Cæsarean section following surgical induction of labour. It is in this group that induction of labour should be performed, particularly if preeclampsia develops.

In all cases of prolonged pregnancy, the difficulties and dangers associated with the larger babies and placental insufficiency should be recognized, and special care given to these mothers during labour.

Summary.

A survey of 1550 pregnancies of 297 or more days' duration at the Royal Hospital for Women, Sydney, shows that the mothers and babies in Sydney are subjected to the same hazards of prolonged pregnancy as the mothers and babies of other parts of the world where similar surveys have been made. Infants delivered after the 296th day are at a significantly greater risk because of unexplained anoxia and difficulties at delivery.

The features and complications of prolonged pregnancy are discussed. The use of surgical induction of labour is of limited value. The assessment of the results of an increased use of surgical induction of labour at Hammersmith Postgraduate Hospital, London, shows that some slight improvement can be expected in the fœtal salvage rate. Selective induction of labour is suggested for those women with prolonged pregnancies at greater risk—the older women, and the women with hypertension or preeclampsia. However, not all infants will be saved from placental insufficiency by induction of labour, and if the indications are extended too far, there will be an increased Cæsarean section rate.

References.

BALLANTINE, J. W. (1902), "The Problem of the Postmature Infant", *J. Obst. & Gynæc. Brit. Emp.*, 2: 521.

BØE, F. (1950), "Hypermature Pregnancy", *Acta obst. et gynec. scandinav.*, Supplement I, 30: 1.

BROWNE, J. C. McCLURE (1957), Symposium on "Non-Toxæmic Hypertension in Pregnancy", Institute of Obstetrics and Gynæcology, London.

CLAYTON, S. G. (1941), "Fœtal Mortality in Postmaturity", *J. Obst. & Gynæc. Brit. Emp.*, 48: 450.

CLAYTON, S. G. (1953), "Fœtal Distress in Postmaturity", *Proc. Roy. Soc. Med.*, 46: 91.

CLIFFORD, S. H., REID, D. E., and WORCESTER, J. (1951), "Postmaturity", *Am. J. Dis. Child.*, 82: 282.

COLLETT, M. E., WERTENBERGER, G. E., and FISKE, V. M. (1954), "The Effect of Age upon the Pattern of the Menstrual Cycle", *Fertil. & Steril.*, 5: 437.

COPE, T. I., and PEARSON, M. G. (1958), "Surgical Induction for Suspected Placental Insufficiency", *Brit. M. J.*, 1: 1211.

GIBBERD, G. F. (1952), "The Clinical Problem of Postmaturity", *New Zealand M. J.*, 51: 277.

GIBBERD, G. F. (1958), "The Choice between Death from Postmaturity and Death from Induction of Labour", *Lancet*, 1: 64.

GIBSON, G. B. (1955), "Prolonged Pregnancy", *Brit. M. J.*, 2: 715.

GUNN, D. L., JENKIN, P. M., and GUNN, A. L. (1937), "Menstrual Periodicity: Statistical Observation on Large Sample of Normal Cases", *J. Obst. & Gynæc. Brit. Emp.*, 44: 839.

HELLMAN, L. M. (1956), "Postmaturity as a Factor in Fetal Wastage", *New York State J. Med.*, 56: 691.

HIGGINS, L. G. (1954), "Prolonged Pregnancy", *Lancet*, 1: 1154.

HIRST, B. C. (1892), "The Disadvantages of Prolonged Pregnancy", *Proc. Philadelphia Co. M. Soc.*, 13: 104.

HOSEMANN, H., and MASSENBACH, W. V. (1949), "Induction of Labour for Postmaturity", *Geburtsh. u. Frauenh.* 8: 357.

KARN, M. N., and PENROSE, L. S. (1951), "Birth Weight and Gestation Time in Relation to Maternal Age, Parity and Infant Survival", *Ann. Eugenics*, 16: 147.

KLOOSTERMAN, G. J. (1956), "Prolonged Pregnancy", *Gynæcologia*, 142: 372.

KOLONJA, S. (1956), "*Die Kindesübertragung: Kritische Betachtungen zum Thema*", *Arch. f. Gynäk.*, 188: 12.

LINDELL, A. (1956), "Prolonged Pregnancy", *Acta obst. et gynec. scandinav.*, 35: 136.

MAURICEAU, F. (1739), "Aphorisms Relating to the Pregnancy, Delivery and Diseases of Women", translated from the French by Thomas Jones, Surgeon, London.

MCKEOWN, T., and GIBSON, J. R. (1952), "Period of Gestation", *Brit. M. J.*, 1: 938.

MCKERRON, R. G. (1907), "The Induction of Labour in Prolonged Pregnancy", *J. Obst. & Gynæc. Brit. Emp.*, 11: 397.

MCKIDDIE, J. M. (1949), "Fœtal Mortality in Postmaturity", *J. Obst. & Gynæc. Brit. Emp.*, 56: 386.

MEYER, A. W. (1915), "Fields, Graphs and Other Data on Fetal Growth", "Contributions to Embryology" No. 4; Publication No. 222; Carnegie Institute, Washington.

MURPHY, E. W. (1844), "A Report of the Obstetric Practice, University College Hospital": 9.

RATHBUN, L. S. (1943), "Analysis of 250 Cases of Postmaturity", *Am. J. Obst. & Gynec.*, 46: 278.

REID, J. (1850), "On the Duration of Pregnancy in the Human Female", *Lancet*, 1: 438, 596.

ROBERTSON, J. B. (1915), "Studies on the Growth of Man", *Am. J. Physiol.*, 37: 1.

SOLTH, K. (1948), "Fœtal Deaths in Prolonged Pregnancies", *Geburtsh. u. Frauenh.*, 8: 188.

SMELLIE, W. (1752), "A Treatise on the Theory and Practice of Midwifery", Wilson, London, Vol. 1: 103.

SPEITKAMP, V. (1937), *Ztschr. Geburtsh. u. Gynäk.*, 116: 10.

SPRENKEL, W. F. (1896), "Prolongation of Pregnancy, Its Dangers and Treatment", *Am. J. Obst.*, 34: 846.

STRAND, A. (1956), "Prolonged Pregnancy", *Acta obst. et gynec. scandinav.*, 35: 76.

SUTTON, D. H. (1950), "Gestation Period", "Textbook of Obstetrics", B. T. Mayes, Australasian Publishing Co., Sydney: 1008.

TAUSCH, M. (1933), "*Beitrag zur Frage der abnorm langen Schwangerschaftsdauer*", *Monatsschr. Geburtsh. u. Gynäk.*, 93: 137.

VON MÜLLER, L. (1954), "*Zur Psychologie der Gestation und zur Frage der Schwangerschafts über Tragung und psychologischer Ursache*", *Gynæcologia*, 138: 447.

VON RÜTTE, U. (1949), "*Der Fruchttod bei verlängerten Schwangerschaften*", *Schweiz. med. Wchnschr.*, 79: 1123.

WALKER, J. (1954), "Fœtal Anoxia", *J. Obst. & Gynæc. Brit. Emp.*, 61: 162.

Reviews.

Essentials of Gynecology. By E. Stewart Taylor, M.D.; 1958. Philadelphia: Lea and Febiger. 9¼" x 5¾", pp. 504, with 343 illustrations. Price: $12.00.

THIS text-book, as its name implies, contains 491 pages of succinct and up-to-date material. The plates and diagrams are very well prepared, lucid and instructive, helping to make the contents ideal for the undergraduate and postgraduate in their gynæcological study.

The author, E. Stewart Taylor, of Denver, Colorado, has been seized with the need to include preventive medicine in gynæcology. As he rightly states, this is important to the practitioner in gynæcology in detecting early malignant lesions.

The inclusion of details of examination for the practitioner and for the patient in respect of the breast are welcome. Malignant conditions of the genital tract are treated in a very satisfactory way, and the short statistical tables of leading world centres indicate that the emphasis on early diagnosis and treatment shows the essential goal to be attained.

Another feature of the book is the list of references at the conclusion of each chapter, for more detailed reading if required. Particularly interesting are the chapters on the endocrine glands. The description of the role of the adrenal and pituitary glands in gynæcology is recommended to all those who desire to have a modern appreciation of investigation into this field. Virilism is adequately covered, and this section is particularly instructive.

The chapter on primary gonadal failure is another which makes interesting reading; it includes the Stein-Leventhal syndrome, in discussing which the author states that care must be taken to prevent too ready a diagnosis and treatment.

The usual operations are described in detail. In this regard it is pleasing to see the technique for intrafascial total hysterectomy, as advocated by Aldridge, given prominent place, and to note the marked reduction in fistula complications. Aldridge himself has said that the concept of this technique which he advocates was influenced by the work of one of our Australian doyens in gynæcology, E. P. Thring. A similar technique has been in vogue in some Australian centres for many years.

To sum up, this book is one which is easy to recommend, as the contents fulfil the requirements for our practitioners in clinical practice. It bears a close similarity to what is taught and practised in this country in anatomy, physiology, pathology and treatment. The author is to be congratulated on the compilation of this text-book, which will have its place in many a bookshelf.

Mycoses of Man and Animals. By R. Vanbreuseghem, M.D.; translated by J. Wilkinson, Ph.D., F.L.S.; 1958. London: Sir Isaac Pitman and Sons, Limited. 9" x 6", with 248 illustrations. Price: 75s. (English).

THIS is a translation of the third part of the second edition of Langeron's *"Précis de Mycologie"*. When Langeron died in 1950, his friend and former pupil, Professor R. Vanbreuseghem, contributed this third part, an entirely new feature, dealing with medical mycology. The contents are arranged alphabetically in 17 chapters commencing with the actinomycoses, followed by aspergillosis, the blastomycoses, cephalosporioses, chromoblastomycosis, coccidioidomycosis, the dermatophytes (the ringworms, 76 pages), haplomycosis, histoplasmoses, levuroses (true yeasts, moniliasis due to *Candida albicans* and torulosis or cryptococcosis), mycetomata, the two piedras, pityriasis versicolor, rhinosporidiosis and sporotrichosis. Each chapter contains a useful historical survey of the subject matter, followed by a mycological description of the fungus concerned, a description of the disease produced and the means of treatment. The only reference to work in Australia seems to be to that of Hart, who in 1947 described an outbreak of moniliasis due to *C. albicans* in turkeys with the loss of 300 young birds. One would have liked to see some references to the excellent work being done in Queensland on fungous diseases. Three classifications of the dermatophytes (ringworms) are given —that of Sabouraud, that of Emmon (simple and in favour in Anglo-Saxon countries), and that of Langeron, Milochevich and Vanbreuseghem. The author points out that the method by which *Cryptococcus neoformans*, causing torulosis or cryptococcosis, gains entrance into man is important; but he considers that the respiratory route has been suggested usually on inadequate evidence. Intranasal instillation in mice did not lead to invasion of the brain through the cribriform plate. Penetration of the skin appears to have caused one case. In a fatal case of cryptococcal meningitis in Australia, the pathologist found a lesion in the lung and a revolver bullet some distance above it, suggesting that the infection may have been introduced by the bullet. A few unusual medical adjectival forms, such as urticarian, suppurated (for suppurative), tissular and veinous are trivialities. Scutula is a pleural noun. Dr. Wilkinson, who is a botanist, seems to have made a good translation, so that the book presents in English, as the dust cover states, "a careful study of the mycoses". There are 76 pages on ringworms for the dermatologist, who would find much interest in following up his cases to the laboratory. If the dermatologist does not possess the book himself, the laboratory should have it.

Diagnostic Laboratory Hematology. By George E. Cartwright, M.D.; Second Edition; 1958. New York, London: Grune and Stratton. 8½" x 5½", pp. 264, with illustrations. Price, $6.75.

THIS book is more than twice the size of the first edition published in 1954. The object of the first edition was to present, for students, medical technologists and doctors, details for performance and evaluation of common hæmatological tests. The author admits a difficulty in adhering to that purpose in his new edition, and includes many complicated methods, such as flame photometry, electrophoresis, phase contrast, etc., which are suitable only for established laboratories.

The book covers most aspects of practical hæmatology, including sections on statistical considerations and care of equipment. It is neatly set out, giving technique, sources of error and interpretations, with recipes for the required solutions and pertinent references at the end of each section. It contains a wealth of practical information not known by the average student, and sometimes not appreciated even by qualified medical technologists or clinical pathologists. It includes presumptive tests and not generally known short cuts in laboratory procedure. The book is analytical and gives just criticism of many of the contained methods. The wording is American. Some of the normal limits and terminology differ from local usage. This is particularly noticeable in the chapter on examination of hæmorrhagic disorders; but the author saves the situation by including a glossary of synonyms.

Data concerning the accuracy of many of the included methods are tested by students. The value of this sort of yardstick is doubtful.

The word "diagnostic" could well be dropped from the title, as in all such books many of the tests are far from diagnostic. The author's use of such words as "crude approximations" and "rough screening procedures" when discussing the erythrocyte sedimentation rate and blood coagulation time estimations would appear to support this contention.

A section on A B O and Rh blood grouping would be a welcome inclusion for many pathologists.

There are other minor criticisms which could be levelled at Professor Cartwright's book, but in the main it achieves a high standard. It can well be expected to become the "cookery book" for many hæmatologists.

Statistica e Sociologia Sanitaria. By Giovanni L'Eltore, E. Caranti, O. Celno, V. Marchiano and V. Rustuchelli; Eleventh Edition; 1956. Rome: 9½" x 6¾", pp. 162, with many illustrations. Price not stated.

THE authors define the fields of sociology and medical statistics. They stress that public health problems cannot be regarded as isolated phenomena, but must be studied in relation to the degree of culture, the frequency of human contacts and many other ecological factors. The epidemiology of tuberculosis and some other diseases is treated along rather classical lines. The statistical methodology is archaic —far too much stress being laid on the crude death rates for comparisons made over a period of 50 years in Italy. The book may be useful for making some international comparisons.

Care of the Premature Infant. By Evelyn C. Lundeen, R.N., and Ralph H. Kunstadter, M.D., F.A.C.P., F.A.A.P.; 1958. Philadelphia and Montreal: J. B. Lippincott Company. Sydney: Angus and Robertson, Limited. 8" x 5", pp. 485, with 87 illustrations. Price: 88s.

"CARE OF THE PREMATURE INFANT" by Julius Hess and Evelyn Lundeen has been revised by Evelyn Lundeen and Ralph Kunstadter. Much stress is rightly laid on skilled nursing and on aseptic technique. Like all experienced nurses, Evelyn Lundeen is concerned at the decline in the teaching of bedside nursing. She emphasizes that good nursing is more important than expensive equipment. The management in Chicago differs from that in Australia, both in the staffing of the nursery and in methods of care. The absence in America of a pool of midwifery trainees and trained mothercraft nurses necessitates the use of previously untrained aides.

The regime sounds Spartan. After the cord separates all infants are given a tub bath daily—those weighing under two pounds on alternate days. They are put to the breast when they reach 3 pounds 12 ounces (1700 grammes) and are discharged from hospital when they reach 4·5 pounds.

The feedings are much less than those to which we are accustomed. Just enough is given for the smaller infants to gain one to two ounces per week, and the larger ones five ounces. The babies gain weight slowly. The superiority of breast milk as a feeding is emphasized. Boiled water or tea is given as a routine between feeds in the early days. Tea is given to prevent abdominal distension. Saline is given daily by the subcutaneous route at times.

It is surprising to read that infants weighing under 2 pounds 3 ounces (1000 grammes) are kept in a concentration of 26% to 32% of oxygen till they weigh 1000 to 1100 grammes; according to the text the period may be 25 to 40 days.

Much of the chapter on pathological conditions deals with general disorders of the newborn rather than with specific disorders of prematurity. There are some obvious omissions.

The activities and requirements of the Chicago Board of Health concerning premature infants are given. Of interest also are the findings of the late Julius Hess on the fate of 72 premature infants of birth weight 1250 grammes (2 pounds 12 ounces) or less who had passed the age of 18 years.

This book is of interest because one can trace through it the stages of development in the care of premature infants since 1922. In several ways it appears to lag behind contemporary thought.

Bibliography of International Congresses of Medical Sciences. Prepared by W. J. Bishop, under the auspices of the Council for International Organizations of Medical Sciences. Oxford: Blackwell Scientific Publications. 8½" x 5½", pp. 260. Price: 25s. (English).

THE publication of a bibliography of this nature provides a welcome avenue of reference to all those interested in obtaining information in regard to the organization and proceedings of medical congresses.

In the introduction to the bibliography, Mr. Bishop emphasizes that it does not purport to be a "complete

coverage of all medical congresses". Despite this, it can be readily appreciated that the task of locating particulars of the 1427 congress meetings, in respect of 362 different aspects of medicine, listed in the bibliography was a formidable one, necessitating great care and patience in the compilation of the details to ensure its success as a tool of reference.

The bibliography provides information on the subject, number, place of meeting, date, language and bibliographical descriptions of medical congresses. Entries have been arranged under subject headings, and an extensive index of synonymous and alternative subject words is included.

If users of this publication respond to Mr. Bishop's request to supply details of congresses which have not been included because of information not readily available at the time, a second and more comprehensive edition will automatically follow. In the meantime the present bibliography will serve as an important guide for those who seek bibliographical data of this nature.

Drugs and the Mind. By Robert S. de Ropp; 1958. London: Victor Gollancz, Limited. 7½" x 4½", pp. 320. Price: 25s. (Australia).

LOOKING for exciting and profitable fields in medical science, pharmacologists have lately led a vigorous attack on the central nervous system, turning up on the way a galaxy of tranquillizers, ataractics, stimulants, psychosomimetics and what have you. In the wake of this attack a spate of publications have appeared—symposia, monographs, review articles and even a few books for the general reader. This new enthusiasm has been reflected in the evolution of new theories and ideas, with often so little evidence in their support that snatching at a straw becomes near proof by comparison.

The fact is that we have now to wade through hundreds of thousands of words to catch a glimmer of new light on drugs affecting the central nervous system. On the popular front, Huxley's "The Doors of Perception" seems to have started things moving, and "Drugs and the Mind" follows the fashion. The dust jacket around this book is designed to whet the appetite with phrases like "the paradox of alcohol", "Freud or the Syringe"; and the reader is informed that "for sheer readability it can compete on level terms with the best of contemporary 'thrillers' ". That, perhaps, we could hardly be expected to agree with; but nevertheless the book is really quite absorbing. Two interesting chapters dealing with mescaline and marihuana start the book off, and are followed by one on drug addiction. A chapter entitled "The Chemistry of Madness" gives a good account of the discovery of the hallucinogenic properties of lysergic acid diethylamide (LSD) and a description of the highly speculative theories for the role of serotonin in the brain. Alkaloids of rauwolfia and the tranquillizers are discussed in relation to mental illness, and mention is made of some of the newer stimulants such as "Meratran" and "Ritalin" and the anticonvulsants. There follows a chapter on "Brews Strange and Brews Familiar", which deals with beverages and decoctions used among primitive peoples for central nervous system effects, and the book concludes with a short chapter on the possible further implications of the control of the mind by drugs.

The book is entertaining, and the author always brings his readers back from the delights of mescaline or the occasional "joy popping" with heroin to the serious dangers that lie ahead for those who might be tempted to repeat the experiments for themselves. For medical readers the book is worth reading. Allowance must be made for the glamour with which science becomes invested in such books, and a few spelling mistakes in drug names should not be allowed to irritate readers unduly, since there is much to be learnt from this book and the summary it provides of the present state of psychopharmacology.

A Manual of Electrotherapy. By Arthur L. Watkins, M.D.; 1958. Philadelphia: Lea and Febiger. Sydney: Angus and Robertson, Limited. 9" x 5½", pp. 260, with 167 illustrations and one plate in colour. Price: 60s. 6d.

ELECTROTHERAPY 25 years ago was regarded as a very important part of physical therapy, but there has been a gradual change accelerated by World War II, till now it takes only a minor part of what is embraced in the concept of rehabilitation.

The first part of this book gives a brief history of physical therapy, and presents the rationale and scope of physical therapy in general. The language is simple and the claims are not extravagant.

The parts on hydrotherapy, massage and exercise, although not rightly within the scope of the book, help to round off the publication for the student of physical therapy.

The discussions of physics and the physiological effects of heat and radiant energy are adequate and concise throughout, and there are excellent illustrations and diagrams. Although artificial ultra-violet light is used less, there is still a need for knowledge of its physiological effects and indications. Its value is no less now than before.

The chapter on electrophysics and general electrotherapy suffices for the student of physical therapy, and the chapters on electrophysiology and electrodiagnosis with all the newer methods cover modern ideas on the subject in a concise manner. The section on high-frequency physics deals with all the forms of treatment commonly used, including microwave. Illustrations are helpful throughout. Electrical stimulation is still necessary in some cases, and much space is devoted to this even to the unusual methods of Batrow stimulation, and the almost defunct static electrotherapy. The inclusion of ultra-sound is justified, for it comes into use in similar cases as much as do all the forms of electrotherapy discussed. It has a useful though limited use, and claims for its widespread use are unjustified.

The whole book is an excellent textbook for students of physical therapy. There is no great interest in the book for medical students or graduates, unless they intend to make physical medicine and rehabilitation a specialty. It is well bound, well printed on excellent paper, and well illustrated throughout, and has an embracing index.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"A Method of Anatomy: Descriptive and Deductive", by J. C. Boileau Grant, M.C., M.B., Ch.B., F.R.C.S. (Edin.); Sixth Edition; 1958. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 10" x 6¾", pp. 906, with 862 illustrations. Price: £6 1s.

The previous edition was published in 1952. The text has been revised throughout.

"Progress in Radiation Therapy", edited by Franz Buschke, M.D., 1958. New York and London: Grune and Stratton, Incorporated. 9" x 5¾", pp. 288, with many illustrations. Price: $9.75.

The first volume of a new publication, which is to appear at intervals of one to two years.

"The Year Book of Pathology and Clinical Pathology (1957-1958 Year Book Series)", edited by William B. Wartman, B.S., M.D.; 1958. Chicago: The Year Book Publishers. Melbourne: W. Ramsay (Surgical), Limited. 7½" x 5", pp. 480, with 171 illustrations. Price: 88s.

One of the Practical Medicine Series of Year Books.

"Muir's Text-Book of Pathology", revised by D. F. Cappell, C.B.E., M.D., F.R.F.P.S., M.R.C.P., F.R.S.Ed.; Seventh Edition; 1958. London: Edward Arnold (Publishers), Limited. 9" x 6", pp. 1224, with 733 illustrations. Price: 70s. (English).

The reviser has exercised careful selection of material to keep the book within reasonable limits and to meet the requirements of medical undergraduates.

"Clinical Chemistry in Practical Medicine", by C. P. Stewart, D.Sc., Ph.D., and D. M. Dunlop, B.A., M.D., F.R.C.P. (Edin.), F.R.C.P. (Lond.); Fifth Edition; 1958. Edinburgh and London: E. and S. Livingstone, Limited. 8½" x 5½", pp. 352, with many illustrations. Price: 27s. 6d. (English).

The book has been thoroughly revised and new material added.

"The Circulation of the Blood: Two Anatomical Essays by William Harvey, Together with Nine Letters Written by Him. The Whole Translated from the Latin and Slightly Annotated", by Kenneth J. Franklin; 1958. Oxford: Blackwell Scientific Publications. 8½" x 5½", pp. 208, with illustrations. Price: 22s. 6d. (English).

A new translation of *De circulatione sanguinis* by the Professor of Physiology at St. Bartholomew's Hospital Medical College.

"The Neurologic Examination: Incorporating the Fundamentals of Neuroanatomy and Neurophysiology", by Russell N. DeJong, M.D.; Second Edition; 1958. New York: A Hoeber-Harper Book. 10" x 6¾", pp. 1096, with 368 illustrations. Price: $20.00.

A fully revised edition prepared in the light of modern advances.

The Medical Journal of Australia

SATURDAY, FEBRUARY 7, 1959.

THE PREVENTION OF TETANUS.

TETANUS is a dramatic disease, as any one who has waited for the critical days to pass will acknowledge. For this reason, and because of the many interesting facets of the disease, it is one which has always attracted much medical attention. Year after year a steady stream of articles and other communications about tetanus appear in the medical journals. Yet in spite of all this attention, tetanus is now more than ever "in the news". The reason for this is fairly obvious. With the virtual conquest of so many of the other killing infectious diseases, tetanus has become proportionately more important. In Australia about one hundred new cases occur every year, and in spite of recent important advances in treatment, the disease still carries a mortality of 30% to 40%; tetanus now kills more people each year than diphtheria; in the five-year period up to the end of 1957, a total of 218 deaths from tetanus was recorded as against 141 from diphtheria, and its victims are mainly the young and active. In the light of these facts there is little excuse for apathy towards the urgent appeals of those who proclaim that tetanus is an entirely preventible disease, and call for strenuous efforts to make immunization as nearly universal as possible.

The efficacy of immunization with tetanus toxoid could not be more clearly shown than by some war-time statistics. In a recent article by C. D. Sherman and D. H. Barnhouse,[1] the authors state that each year in the United States between 500 and 600 people die of tetanus; they contrast this with the fact that during the five years of American participation in World War II only five cases of tetanus occurred among members of the United States armed forces who had received routine immunization and a booster dose of toxoid after injury. Such statistics can be multiplied indefinitely. However, it may be questioned whether it is practicable to persuade the civil population to submit to immunization and to maintain that immunity. The example of diphtheria suggests that with adequate publicity and supportive organization this should be eminently possible. In some countries the campaign against diphtheria has been so successful that the disease is now almost unknown. In Australia the standard of immunization against diphtheria is somewhat less than ideal, but even so diphtheria is now something of a rarity. The advent of "Triple Antigen" now makes it not unreasonable to expect all children to receive immunization against tetanus in infancy, and this immunity can be maintained by booster doses of combined tetanus and diphtheria antitoxin at appropriate intervals.

A recent report by C. D. Barrett and co-workers[2] describes the successful results of a trial of a "quadruple antigen", in which they combined the antigens of poliomyelitis, diphtheria, pertussis and tetanus. The trial was conducted in a group of infants and young children, and a good antibody response was obtained to all antigen components of the vaccine. It may therefore soon be possible to give all essential immunizing antigens in a single "package". This will obviously be an important step forward: in an injection-conscious age it should be relatively easy to persuade almost all parents to present their children for a single course of injections to protect them against all the most important infections. At present the conflicting claims of several different immunizing procedures must tend to cause confusion, and parents will be inclined to consider only the latest in the field, and to leave it at that.

There is little doubt that sooner or later some such course of comprehensive injections will become available as a part of the preventive health measures offered through the child and school health services. In the meantime much can be done by individual doctors in encouraging parents to have their children immunized with "Triple Antigen" as well as sending them to receive Salk vaccinations. One point needs stressing. In a letter published some time ago, D. W. Johnson[1] pointed out that "children are given many antigens, and it is easy for both patient and parent to be confused about the diseases from which they have been protected". It is most important that the recipients of immunizing procedures should be given cards stating clearly what inoculations they have received. Johnson knew of two cases in which tetanus developed in children who were wrongly believed to have been actively immunized against the disease and so received only a booster dose of toxoid. He emphasizes that unless the doctor is satisfied beyond reasonable doubt that a child with an injury has received satisfactory basic immunization, he should give an adequate dose of tetanus antitoxin in addition to toxoid.

Elsewhere in this issue we publish three contributions on the subject of immunization against tetanus. On page 185 T. H. Ackland has contributed an article dealing with many important aspects of the subject. Some points raised are not as generally known as they should be. Though apparently demonstrated over 20 years ago, it has only recently become generally recognized that the passive immunity conferred by an injection of tetanus antiserum, in any case of limited duration, disappears very rapidly indeed if the patient has had a previous injection of antiserum. This is the reason why some hospitals now try to ensure that anyone who receives an injection of tetanus antiserum should also receive a course of active immunization. Ackland is somewhat conservative in recommending that in case of injury a full course of active immunization should be given to anyone whose last toxoid inoculation was given more than five years previously; it appears to be widely accepted that in most patients a booster dose of toxoid will produce protective blood levels of antibodies for at least 10 years after a full immunization course. This last statement has been widely repeated, and is made again in the recommendations for tetanus prophylaxis issued by the Commonwealth Serum Laboratories, which we print on page 210. These recommendations give an authoritative answer to a number of questions which crop up from time to time, and might usefully be kept

[1] *Surg. Gynec. Obstet.*, 1958, 107: 142 (August).
[2] *J. Amer. med. Ass.*, 1958, 167: 1103 (June 28).

[1] MED. J. AUST., 1957, 1: 298 (March 2).

in the surgery for convenient reference. Both in this statement and in Ackland's article the intradermal test dose commonly used when tetanus antitoxin is given is condemned as unreliable, and an alternative subcutaneous trial dose is described. The third article (page 188), by S. Wiener and R. W. Patterson, gives the results of a laboratory investigation into the persistence of circulating antitoxin in young children after active immunization with tetanus toxoid. These demonstrate once again the efficacy of this procedure. Perhaps their most important conclusion is that "provided a good basic immunity against tetanus has been established, routine booster injections every five years should be sufficient" to maintain a protective level of circulating antitoxin.

Current Comment.

MEDICINE AND THE ROYAL NAVY.

SOME years ago, the late Surgeon Commander J. J. Keevil set himself the exacting task of writing a detailed and comprehensive survey of medical services available to the Royal Navy from primitive beginnings in the middle ages down to the end of last century. All medical historians will mourn the recent passing of a colleague who had earned for himself an enviable reputation for personal bravery, ripe scholarship, intellectual integrity and an indefatigable perseverance in the stern disciplines of historical writing and research. It is a great pity that his ambitious designs should remain uncompleted when there was still so much to be done.

The first volume of this survey, which covered the period from A.D. 1200 to the death of Charles the First, was reviewed in this Journal last year.[1] At that time admiration was expressed for the completeness of the whole scheme and for the painstaking research involved in tapping reliable sources of information from official records and from the history of each period; but the volume left the impression that the English navy and its medical services were in such an early stage of embryonic development that the features were well nigh indistinguishable. However, in the second volume[2] the Royal Navy begins to take definite shape, and all three branches of the medical profession—apothecaries, surgeons and physicians—share the responsibility of caring for the health and general welfare of naval personnel, both in peace and in war. In fact, the author shows "how the medical service of the navy developed under the Commonwealth, Protectorate and the later Stuarts into a corporate organization designed to meet needs distinct from those served ashore".

It is significant that under the more democratic form of government instituted by Oliver Cromwell there was an unprecedented move to show some consideration for the actual living conditions, the misfortunes and even the personal feelings of the ordinary British seaman; to provide him with adequate medical attention for the treatment of injuries or sickness; and to care for the widow or orphans in the event of his death in the service of his country. In 1653 the Council of State took the first official step by appointing a young physician, Dr. Daniel Whistler, as the medical authority to advise on matters pertaining to the welfare of sick and wounded men at Portsmouth, and to administer an emergency medical service if at any time the need should arise.

For the greater part of the second half of the seventeenth century England was at war with Spain or Holland, and there was obviously a growing concern on the part of the Admiralty for sailors or soldiers wounded in battle and for the many thousands who contracted epidemic diseases in the dreaded excursions to the West Indies. With the return of the fleet to home waters, physicians and surgeons experienced much difficulty in finding accommodation for their patients in the two large public hospitals (St. Thomas's and St. Bartholomew's) in London, and were forced to billet many of them among the townspeople at various ports. Later on the position was improved as they succeeded in their efforts to have a reasonably well-equipped hospital ship attached to the fleet, and to establish naval hospitals at the more important coastal depots in England.

There can be no doubt that Surgeon Commander Keevil's work so far accomplished will long remain the standard reference books which must be consulted by those needing authoritative and documentary information on any official proclamation or action relating to the early organization of the Royal Naval Medical Services. Like its predecessor, the second volume cannot be regarded as a source of entertainment, because of its coldly objective quality in the treatment of events and personalities. Even that efficient public servant, Mr. Samuel Pepys, who is universally recognized as a man of energy, enterprise, pleasure and official pleasantness, is here represented as a prosy, soulless bureaucrat, whose only interest in life is in promulgating uninspiring rules and regulations from an Admiralty office in London.

BRITISH EMPIRE CANCER CAMPAIGN: THIRTY-FIFTH ANNUAL REPORT.

THE latest annual report of the British Empire Cancer Campaign,[1] which is in two parts with a supplement, resembles its predecessors in embodying a great volume of research. As might be expected, the list of carcinogens has been extended, and new or improved techniques in experimentation have been devised which cannot fail to be of service in other fields than that occupied by cancer. As usual, some useful discoveries have been made in applied physics. A delicate but simple method for the measurement of alpha-ray activity has been elaborated, making it possible to allocate such activity between members of the radium and thorium series. One result has been to show that, at least in the child, food is the important factor in the daily intake of radioactive matter. Intensification of the X-ray image has been successfully studied, allowing the information given the observer to be about three times that visible to the naked eye on the fluorescent screen. It is estimated that chest examinations can be carried out with dose levels of half those normally employed; this reduces the hazards which have been begetting much anxiety of late.

Amongst findings of general importance in the report the following may be mentioned. Cutaneous carcinogens act not merely on the epithelium, but on the whole cutaneous field. Skin fragments implanted into a subcutaneous site which had been treated with a carcinogen developed squamous carcinoma, though subjected to a concentration of the carcinogen lower than the minimum

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[1] MED. J. AUST., 1958, 1:44 (January 11).

[2] "Medicine and the Navy, 1200-1900", by J. J. Keevil; Volume II (1649-1714); 1958. Edinburgh and London: E. and S. Livingstone, Limited. 8½" × 6", pp. 332, with illustrations. Price: 40s.

[1] "British Empire Cancer Campaign: Thirty-Fifth Annual Report Covering the Year 1957": Part 1. The Chairman's Statement and the Accounts of the Central Organization. London: British Empire Cancer Campaign. 9¾" × 7", pp. 40. Price not stated. "British Empire Cancer Campaign: Thirty-Fifth Annual Report, 1957": Part 2. "The Scientific Report of the Researches Undertaken by the Central Organization and its Autonomous Councils in the United Kingdom and by Some of its Affiliated Organizations Overseas." London: British Empire Cancer Campaign. 9¾" × 7", pp. 550. Price not stated. "British Empire Cancer Campaign: Thirty-Fifth Annual Report Covering the Year 1957": Supplement to Part 2. Report by Percy Stocks, C.M.G., M.D., F.R.C.P., on "Cancer Incidence in North Wales and Liverpool Region in Relation to Habits and Environment". 1958. London: British Empire Cancer Campaign. 9¾" × 7", pp. 170. Price not stated.

necessary when the usual painting technique was employed. Another significant fact emerges from an experiment in which ovaries from mice painted with a carcinogen which produces a high incidence of ovary and mammary tumour were transplanted into normal mice and vice versa. The normal mice with the grafted ovaries developed ovarian tumours but no mammary ones; on the other hand, the painted mice with ovaries from normal mice showed a high yield of mammary but no ovarian tumours. Experimental proof is still lacking that tar from burning cigarettes can be carcinogenic.

As with its predecessors, it may be said of this latest report that specialists in most fields of medical and biological experimentation will find something stimulating and useful, but the central problem of cancer remains elusive. It is certainly curious that throughout this long and detailed report no notice whatsoever is taken of the possible relations between viruses and cancer. That this view has not been abandoned elsewhere can be seen from many recent statements, particularly that by an acknowledged expert, Wendell M. Stanley of Berkeley, California.[1]

INTERNATIONAL VALUES FOR THE YARD AND THE POUND.

AGREEMENT has been reached between the national standards laboratories in British Commonwealth countries and the United States of America on international values for the yard and the pound, fundamental units in the British system of weights and measures. They have issued the following joint announcement:

> The Directors of the following standards laboratories,
>
> Applied Physics Division, National Research Council, Ottawa, Canada,
>
> Dominion Physical Laboratory, Lower Hutt, New Zealand,
>
> National Bureau of Standards, Washington, United States,
>
> National Physical Laboratory, Teddington, United Kingdom,
>
> National Physical Research Laboratory, Pretoria, South Africa,
>
> National Standards Laboratory, Sydney, Australia,
>
> have discussed the existing differences between the values assigned to the yard and to the pound in different countries. To secure identical values for each of these units in precise measurements for science and technology, it has been agreed to adopt an international yard and an international pound having the following definitions:
>
> the international yard equals 0·9144 metre;
>
> the international pound equals 0·453 592 37 kilogram.
>
> It has also been agreed that, unless otherwise required, all non-metric calibrations carried out by the above laboratories for science and technology on and after July 1, 1959, will be made in terms of the international units as defined above or their multiples or submultiples.

This agreement will affect only measurements made at the highest standard of precision. It will have no effect on the ordinary measurements of trade and commerce. At the same time, it is of great importance in achieving complete interchangeability in measurement between the countries using the British system of measurement. British Commonwealth countries and the United States both use the system which was formerly known as the Imperial system of weights and measures. The basis of the system in the United States is different from that used in Commonwealth countries. The British or Imperial standard yard is defined by the distance between marks on a bronze bar held by the Board of Trade in the United Kingdom. The United States yard is defined in terms of the international metre. Comparisons between the yard and the metre have shown that the British yard is slightly smaller than the American yard. Neither yard can be expressed with sufficient accuracy in terms of the metre using only a few figures after the decimal point. However, it so happens that a simple conversion between the yard and the metre which is commonly used in industry is almost exactly halfway between the British and American figures. This ratio of "the yard equals 0·9144 metre" has been adopted as the international value. By this agreement the national standards laboratories will all use only one standard of length for the yard. This standard is two parts in a million larger than the present British standard and two parts in a million smaller than the present American standard.

[1] *Science*, 1958, 128: 906 (October 17).

SOME FACTS ABOUT QUEENSLAND.

To avoid duplication, the Commonwealth Bureau of Census and Statistics has now taken over the routine compilation of statistics in the States, recent political developments, the second World War and uniform taxation having speeded this change-over. The first issue of the Queensland Year Book to appear since this new arrangement started has now been published.[1] It is not the sort of book that lends itself to condensation or detailed review, but it may be of interest to refer to a few facts taken from here and there in the great mass of information supplied. Queensland is unique among the States in having a number of large provincial cities, which bear some comparison with the metropolis. Brisbane, by a very liberal interpretation of the city bounds, now numbers over half a million inhabitants. Townsville, Toowoomba, Ipswich and Rockhampton each have populations of over forty thousand. Queensland has a large population in the tropics, and the published figures show there are only slight mortality differences between the tropical and subtropical areas. For Queensland generally, the months of highest mortality are in the late winter. The combined stillbirth and infant mortality rate is less than 4%. Fertility rates since the war have been high and now are of the same order as those existing fifty years ago. Two hundred cases of leptospirosis were notified in 1956, 34 of typhus, 18 of malaria and 112 of poliomyelitis. Some three hundred cases of dysentery were notified, but only one death occurred from this cause in subjects under the age of sixty years.

"FOLLOWING."

ENGLISH is a living language, and no one should object to developments which increase its clarity and usefulness, unless they are ugly. Some fashions in usage, however, seem pointless and difficult to justify. One of these is the current use of "following" as a preposition. Its fatuous character has been so beautifully exposed by Raymond Greene in a letter to the Editor of the *British Medical Journal*[2] that we are taking the liberty of reproducing the letter here. It must be acknowledged as the definitive comment on the matter. Dr. Greene writes:

> Sir: Recently, in a Very Important weekly medical journal, a Very Important Cardiologist stated that a patient collapsed "following a large hæmoptysis".
>
> I remember a colonel who collapsed following a large tiger and a South American band-leader (obese and no longer young) who collapsed following a large blonde. But why, I asked myself, should anyone follow a large hæmoptysis? My first thought was that he was a "time-expired registrar" who intended to write a paper about hæmoptysis: my second that "hæmoptysis" was a misprint for "hippopotamus". Dr. H. M. Sinclair's letter (*Journal*, November 29, p. 1559) provides an alternative explanation. Could the Very Important Cardiologist have meant that his patient collapsed *after* a large hæmoptysis? What a dull solution of a fascinating problem!
>
> I am, etc.,
>
> RAYMOND GREENE.
>
> London, S.W.3.

[1] "Official Year Book of Queensland, 1957, No. 18", compiled by S. E. Solomon; 1958. Brisbane: A. H. Tucker. 8½" × 5½", pp. 462. Price not stated.

[2] *Brit. med. J.*, 1958, 2: 1527 (December 20).

Abstracts from Medical Literature.

OPHTHALMOLOGY.

Primary Tumours of the Iris.

B. RONES AND L. ZIMMERMAN (*A.M.A. Arch. Ophthal.*, August, 1958) have reviewed 125 cases of malignant melanoma treated by iridectomy. As a result of their survey they are convinced that iris tumours are relatively benign, and conservatism is recommended in their management. Enucleation is probably never justified solely because the pathological diagnosis of an iridectomy specimen is malignant melanoma. Evidence of incomplete excision with residual tumour in the ciliary body or chamber angle is a legitimate reason for enucleation.

Self-Sterilizing Property of Vitreous.

H. REED *et alii* (*A.M.A. Arch. Ophthal.*, September, 1958) make a preliminary report on the self-sterilizing properties of human vitreous. Human vitreous was obtained from post-mortem material and infected with suspensions of *Staphylococcus pyogenes*, *Streptococcus pyogenes*, *Escherichia coli*, *Pseudomonas æruginosa* and *Bacillus subtilis*. The infected vitreous was placed in the refrigerator at a temperature of 4° C. The vitreous was found to be self-sterilized except in the case of *B. subtilis*. Before routine use this self-sterilizing property should not be taken for granted, but a 48 hour culture should be tried to confirm sterility. Storage for several days at 4° C. will often render the vitreous sterile. This self-sterilizing property may be due to the presence of an antibacterial substance.

Retinoblastoma Treated by Radiotherapy and Tretamine.

A. REESE *et alii* (*A.M.A. Arch. Ophthal.*, November, 1958) report on their treatment of retinoblastoma by X-ray therapy, in dosage of 325*r* combined with intramuscular injection of tretamine. For more desperate cases tretamine is administered by the intraarterial route using the internal carotid artery on the side of the involved eye. Tretamine is given by this route for patients with large multiple lesions, patients with tumour seeds in the vitreous, patients with intraocular lesions unsuccessfully treated by other methods, patients with residual tumour in the optic nerve after enucleation, patients with residual tumour in the orbital tissue, and patients with recurrent orbital growth. The authors describe their techniques of X-ray and tretamine therapy. By the use of the techniques described, they have succeeded in achieving a 90% cure rate.

Conjunctival Flaps in Corneal Disease.

T. GUNDERSON (*A.M.A. Arch. Ophthal.*, November, 1958) discusses the uses of conjunctival flaps in the treatment of corneal disease. The benefits of a conjunctival flap are: the ulcer is protected from tears and other secretions, superficial vessels are destroyed if a corneal peritomy is done, trauma is lessened, blood and serum are in direct contact with the ulcer, and the nerve supply to the cornea is cut off. Objections to conjunctival flaps are that the progress of the disease is obscured, the status of the pupil cannot be assessed, secondary glaucoma can be determined only by digital palpation, a second operation is difficult, and transient ptosis may follow the operation. Herpetic ulcers, relapsing erosions, bullous keratopathy, marginal ulcers, blind painful eyes and filamentary keratitis may be benefited by complete conjunctival covering. The author describes the technique which he has used for the past five years.

Horner's Syndrome.

C. L. GILES AND J. W. HENDERSON (*Amer. J. Ophthal.*, September, 1958) review 216 cases of Horner's syndrome seen over a period of 21 years. They conclude that the most common site of interruption of the sympathetic pathway to the eye is in the sympathetic trunk and in post-ganglionic fibres before the beginning of their intracranial course. Neoplasm, malignant more often than benign, is the most common etiological agent. Bronchogenic and metastatic carcinomata are the most frequent malignant growths to cause this syndrome. Trauma and vascular lesions are the commonest etiological agents when the level of interruption is at the anterior spinal root in the brain stem. The syndrome is seen most commonly in elderly people. In the first two decades of life trauma is the most common cause of the condition. The presence of heterochromia indicates that the condition originated before the age of two years.

PHYSICAL MEDICINE.

Optimum Work Output in Elbow Flexion, Shoulder Flexion and Grip Ergography.

H. H. CLARKE *et alii* (*Arch. phys. Med.*, August, 1958) have carried out investigations into the optimum work output for single-bout elbow flexion, shoulder flexion and grip ergography, and present the following conclusions. (i) For elbow flexion ergography, the best combination was a load of one-quarter proportion of elbow flexion strength and a cadence of 76. As the statistical significance did not quite reach the 0·05 level of confidence, this condition is recommended only for this form of ergography. (ii) For shoulder flexion ergography, the combination of three-quarters proportion of shoulder flexion and strength and a cadence of 84 had some advantage over the other conditions. However, as this combination is not statistically significant, this combination is suggested only for this form of ergography. (iii) For grip ergography, the combination of one-half proportion of grip strength and a cadence of 76 was best. This combination should be used for this form of ergography. The studies were carried out with two Kelso-Hellebrandt instruments, the elbow and shoulder ergograph and the grip ergograph. The subjects were male students at the University of Oregon, aged 18 to 26 years, who were free from physical handicaps and were willing to participate in the ergographic exercises; they were selected at random. Full details of the methods used in the study are given.

Training for the Cerebral Palsied.

J. E. MASCHMEYER *et alii* (*Arch. phys. Med.*, August, 1958) present an account of the work done in pre-vocational and vocational training of cerebral palsy subjects at the Industrial Training Workshop opened in 1952 in Los Angeles by the United Cerebral Palsy Association of Los Angeles County. There have been 250 "clients", 158 male, 92 female, whose ages ranged from 16 to 52 years; 60% were aged less than 30 years. The physical involvement in the group was as follows: severe, 25%; moderate, 50%; mild, 25%. The mean mental ability was about 82, as compared with 100 in the normal population. The manual dexterity, as determined by standardized tests, was far below normal; bilateral gross tests gave the poorest results, bilateral fine tests gave very poor results, and unilateral gross tests gave results under the 26th percentile for the normal. None the less, significant improvement in activities of daily living resulted from training at the centre, and the percentage of persons with outside full-time employment rose from 15 to 60 in the group who received workshop training there. Counselling and experience in the workshop appear to lead to improved emotional adjustment and better work habits. Emotional adjustment improved in half of the entire group at the centre and in 60% of those receiving workshop training. Most of the cerebral palsied adults who attended the centre found acceptance, understanding of their problems and fellowship with others similarly handicapped. The authors state that it is too soon to tell whether training as given will lead to long-term employment. Further studies are envisaged to elucidate the factors most important in the attainment of personal and economic independence by the cerebral palsied adult.

Trochanteric Bursitis.

T. P. ANDERSON (*Arch. phys. Med.*, October, 1958) presents an evaluation of trochanteric bursitis, on the basis of a study of 45 cases with regard to characteristic symptoms and physical findings, and associated disorders. He states that there is a wide distribution of the condition in both sexes at all ages after 30 years. The predominant symptom is intermittent aching pain, usually of long duration, in the lateral aspect of the hip. In every case of the series, either the pain was located in that region or else radiated to it from the knee or back. Radiation of pain from the trochanteric region down the lateral aspect of the thigh occurred in over half the cases. The most consistent physical finding (91% of cases) was tenderness about the greater trochanter, usually on the postero-superior aspect over the tendinous insertion of the gluteus medius. Pain on extremes of hip motion occurred in 62% of cases, usually with internal rotation and abduction. Pain on strong contraction of one or more hip groups, usually the abductors, was present in one-third of the cases. Weakness of one or more hip groups and limitation of hip motion were infrequent findings; when they were present, they

were often due to an associated disorder. Calcification in soft tissues about the greater trochanter, radiologically demonstrated, occurred in only eight of the 45 cases. In 25 cases trochanteric bursitis was secondary to some associated disorder. Eleven of the patients were referred or admitted to hospital with a different diagnosis. In only nine cases was the diagnosis straightforward and not complex.

The Quantitative Measurement of Spasticity.

W. J. ERDMAN AND A. J. HEATHER (*Arch. phys. Med.*, October, 1958) have evolved a method of measuring spasticity quantitatively. They state that such a method makes possible the objective evaluation of the effectiveness of anti-spasticity drugs and other forms of therapy. The method described consists in the measurement and recording of muscle tension and electrical potential of the muscle in response to a mechanical stimulus of known magnitude. The findings are recorded by the use of a two-channel direct writer. The Achilles tendon was stimulated mechanically. The muscle tension developed was measured by a strain gauge which recorded the pressure. A skin electrode was used in recording the electrical potential of the muscle. Patients with spastic phenomena were evaluated before any form of anti-spasticity treatment was given and again after treatment, and the serial findings were compared. The authors state that studies of various anti-spastic compounds are still being carried on. The apparatus in use has undergone many alterations, and is certain to be further altered to improve the accuracy of the method.

Pressure in the Production of Ischial Ulcers.

M. KOSIAK *et alii* (*Arch. phys. Med.*, October, 1958) present an evaluation of pressure as a factor in the production of ischial ulcers. The magnitude and distribution of pressures under the ischial tuberosities as well as the remainder of the sitting area were measured while 11 normal adult subjects were seated on various types of surfaces, including an alternating pressure chair. Pressures under the ischial tuberosities and the adjacent lateral areas were generally in excess of 300 mm. of mercury on a flat padded and unpadded surface, as well as on an unpadded contour surface. There was a drop in the maximal pressure to approximately 160 mm. when subjects were seated on a flat surface padded with two-inch foam rubber. Pressures at nearly all positions measured with the subject seated on the flat hard surface with and without padding, as well as on the unpadded contour chair, were in excess of the arterial diastolic pressure, and far above the accepted mean capillary pressure. Only an alternating pressure contoured chair provided intermittent reduction of pressure to levels in the range of the capillary blood pressure.

Antispasmodic Drugs in Spinal Cord Injuries.

R. H. NYQUIST, A. E. COMARR AND E. BORS (*Arch. phys. Med.*, November, 1958) have made a comparative study of antispasmodic drugs in the treatment of patients with spinal cord injuries. Their conclusions are as follows: "Equanil" (meprobamate) is the drug of choice for the relief of spasticity. Phenobarbital is a valuable substitute. "Flexin" (zoxazolamine) was not entirely free from untoward effects. None of these drugs replaces myotomies, tenotomies, neurotomies, rhizotomies or subarachnoid alcohol injections for extreme spasticity with contractures. None of the drugs interferes with bladder rehabilitation.

Effect of Metal Implants on Temperature Distribution in Ultrasound.

J. F. LEHMANN, G. D. BRUNNER AND J. A. MCMILLAN (*Arch. phys. Med.*, November, 1958) have carried out experiments in which measurements were made of the temperature distribution curves in thigh specimens with and without surgical metal implants. They state that their observations show that the metal implant does not lead to any appreciable rise of temperature in front of the metal. The thermal conductivities of metals and of the surrounding tissues were compared. It was found that the metals were much better heat conductors than the tissues. The high thermal conductivity of the metals compensates for the rise of temperature in front of the metal implant which may result from reflection at the metal surface. The authors state that these data suggest that it may be possible to use ultrasound as a means of deep heating of tissues in spite of the presence of the metallic surgical implants. Further studies must be carried out on live animals before application to human beings can be safely considered.

A Device to Apply Heavy Lumbar Traction.

J. F. LEHMANN AND G. D. BRUNNER (*Arch. phys. Med.*, November, 1958) describe an hydraulic device delivering heavy lumbar traction in the upright position. They state that the advantage of the apparatus is that a smooth and fast release of traction can be obtained. Under traction, the proper alignment of the lumbar vertebræ is maintained. The machine produces a statistically significant widening of the intervertebral spaces and a therapeutic stretching of the lumbar musculature. The authors consider that preliminary results obtained in the treatment of patients with a degenerated lumbo-sacral disk or an acute protrusion of a lumbo-sacral disk seem to encourage further clinical investigations. However, the results by no means prove that this apparatus is superior to other traction methods, nor does the study statistically indicate that a definite therapeutic effect has been obtained. Further controlled statistical studies will be necessary to investigate the therapeutic efficacy of this method of treatment.

Heat Pyrexia following a Hydrotherapeutic Procedure.

W. E. MARCHAND (*Arch. phys. Med.*, November, 1958) reports a case in which a patient who had long been under treatment for general paralysis of the insane was placed in a sedative bath at a temperature of 96° F., with the usual precautions. After 80 minutes, manifestations of heat pyrexia appeared. Appropriate treatment was applied, and the patient made a complete physical recovery after some days. There were no obvious mental changes which could be attributed to brain damage caused by the hyperthermia. The author stresses the need to take the rectal temperature of patients for whom a sedative bath is intended; such treatment should be given only if the rectal temperature is normal.

Hip Abduction Braces for Adults.

G. G. HIRSCHBERG (*Arch. phys. Med.*, October, 1958) has tried the use of hip abduction braces of two types in the treatment of adults suffering from hip adduction contracture or hip adductor spasticity. The series consisted of eight patients, and the author presents a preliminary report on his results. He states that the patients with bilateral symmetrical hip adduction contracture showed greater improvement than those with unilateral hip adduction contracture. The two patients with adductor spasticity experienced a marked decrease in spasticity and good functional improvement. The author concludes that though it is uncomfortable, the hip abduction brace is a useful adjunct in the treatment of hip adduction contracture and adductor spasticity.

THERAPEUTICS.

Multiple Antigen Against Poliomyelitis, Diphtheria, Pertussis and Tetanus.

C. D. BARRETT *et alii* (*J. Amer. med. Ass.*, June 28, 1958) present a preliminary report on the response of infants and young children to primary immunization with a multiple antigen against poliomyelitis, diphtheria, pertussis and tetanus. The vaccine was compounded from poliomyelitis vaccine prepared by the formalin/ultra-violet irradiation procedure, purified and formalin-treated diphtheria and tetanus toxoids, and an inactivated pertussis suspension. Concentrates of the component antigens were used so that a fully effective dose of each would be contained in an inoculum volume of 0·5 millilitre. The components were adsorbed on Holt-type aluminium phosphate adjuvant. Recrystallized benzethonium chloride in a dilution of 1 : 40,000 was used as preservative. The subjects for this trial were children ranging from two and a half months to five years. All received three intramuscular injections of the vaccine at monthly intervals, and those starting the series before they were six months old were given four injections. Blood specimens were obtained at the time of each inoculation and one month after the final injection. It was found that the incidence of pre-immunization antibodies was lowest in the seven to nine months old group, indicating a need for immunization before this age. Good antibody response was obtained to all antigen components of the vaccine in all the age groups studied, but a fourth dose was found to be desirable for children less than four months old at the beginning of the course, to enhance poliomyelitis virus antibody levels.

Special Articles.

RECOMMENDATIONS FOR TETANUS PROPHYLAXIS.[1]

AT the present time the types of wounds most likely to produce tetanus cannot be determined by clinical methods. As the administration of tetanus antitoxin has several disadvantages, active immunization against tetanus must be undertaken if this disease is to be prevented.

Active Immunization.

A person would be considered to have had a complete active immunization after the injection of three doses of 1·0 millilitre of the formalinized toxoid (tetanus prophylactic) or 0·5 millilitre of the purified tetanus toxoid (aluminium phosphate adsorbed). The interval between the first and second doses should be six to twelve weeks and between the second and third doses six to twelve months. In a child, three doses of combined antigen at monthly intervals followed by a "booster" dose six to twelve months after the last injection will confer active immunity.

Passive Immunity.

Passive immunity may be conferred by the administration of tetanus antitoxin. Passive immunity may be conferred on a newborn baby if the mother has been actively immunized.

Duration of Immunity.

Immunity lasts (*a*) within five years of complete immunization, or (*b*) within five years of a "booster" dose of toxoid subsequent to a previous complete immunization; (*c*) within six months of two injections of toxoid given at monthly intervals in an adult or three injections of a combined antigen given at monthly intervals in an infant; (*d*) within ten days of administration of tetanus antiserum if no horse serum has been given previously.

Management of Injuries in Patients.

Immune.

For ordinary injuries, one millilitre of formalinized toxoid should be given immediately, and no tetanus antitoxin need be given. If tetanus toxoid has been given in the previous six months, then no prophylaxis is necessary.

The formalinized toxoid is preferred at the time of injury, as it is absorbed more readily and produces a protective antibody titre more rapidly than the adsorbed preparations.

In all injuries with gross tissue damage, severe burns, and injuries associated with shock and hæmorrhage, formalinized toxoid one millilitre should be given. At the same time, a minimum of 1500 units of tetanus antitoxin should be given in a different syringe in a separate limb. If the patient is found to be sensitive to tetanus antitoxin, full reliance should be placed on tetanus toxoid.

The duration of immunity conferred by a full course of tetanus toxoid is still uncertain, but it has been demonstrated that "booster" doses of tetanus toxoid will produce protective blood levels of antibodies against tetanus in most patients after ten years or longer. *Therefore, in any patient who has had a full course of immunization previously, tetanus toxoid should always be given as the main prophylactic.*

Non-Immune.

Non-immune patients who sustain an injury should receive a minimum of 1500 units of tetanus antitoxin. Where there has been extensive tissue damage, gross contamination or delay in treatment, then larger doses should be given. If there is any evidence or risk that the danger of tetanus persists, such as with infected penetrating wounds, infected compound fractures, extensive burns, or if the patient has previously received horse serum (antitoxins, antivenenes), and hence may rapidly eliminate it, the dose should be repeated at five to seven day intervals during the risk period.

Active immunization should be undertaken as soon as possible. It may be commenced at once, provided that the tetanus toxoid is injected into a separate limb, using a fresh syringe. The active immunity derived from the first two doses will be slightly diminished as a result of giving coincidental antitoxin, but normal antibody levels will be achieved after the third injection.

Record of Immunization.

It is highly desirable that all patients should be supplied with a card giving full details of the immunization procedure so that it may be produced at the time of a subsequent injury. The significance of the procedure and the duration of immunity should be explained to the patient.

TESTING FOR SENSITIVITY TO TETANUS ANTITOXIN.

The intradermal skin test has been employed for many years for testing sensitivity to tetanus antitoxin. It has been found to be an unreliable guide for such sensitivity as it yields a high percentage of local reactions in persons who could safely be given serum. Again, serious anaphylactic reactions have followed negative responses to intradermal tests.

The subcutaneous trial dose advocated by Laurent, Parish and later Moynihan[1] overcomes these disadvantages in that it is a test for general reactions and general reactions alone. A modification of this technique is, at present, under fairly extensive trial in Melbourne, and the results are most satisfactory.

The trial dose consists of 0·5 millilitre of a 1:50 dilution of tetanus antitoxin, that is, 15 units, which is injected subcutaneously. The patient is then observed for thirty minutes for signs and symptoms of a constitutional reaction, namely, pallor, sweating, headache, nausea and vomiting, dyspnœa, urticaria, and fall in blood pressure. Any such general reaction which follows this small trial dose should be mild and respond rapidly to treatment.

If no reaction occurs, then at the end of 30 minutes the full dose may be given. The patient is observed for a further 30 minutes. Should a reaction occur, then a tourniquet should be placed above the site of the injection and adrenaline and an antihistamine administered accordingly. When all signs and symptoms have subsided, a further trial dose should be given. The patient will usually be found to be in a refractory state and hence insensitive, so that the full dose may be safely given. In the event of a further reaction the need for antitoxin should be reassessed, and further tetanus prophylaxis should be managed by a trained allergist.

Experience to date has shown that an extremely small number of persons has reacted to the subcutaneous trial dose, and the reactions have all been mild. This is in marked contrast to the 10% or more who have given positive reactions to the intradermal test. Much valuable time has been saved by the avoidance of needless desensitizations, and many others have not been denied tetanus antitoxin on questionable grounds. The widespread adoption of the subcutaneous trial dose will place sensitivity testing on a safe, sound and expeditious basis.

Finally, although it is desirable to give tetanus antitoxin as soon as possible after the injury, it may be safely deferred to a time within the first twenty-four hours which is convenient to doctors and hospital staff for the requisite observation of the patient. It should be remembered that sensitivity testing is designed to prevent severe immediate general or anaphylactic reactions and gives no guide as to whether serum sickness will ultimately develop. This syndrome will appear in 2% to 3% of cases and is neither predictable nor avoidable.

[1] This statement has been supplied by the staff of the Commonwealth Serum Laboratories in response to a request for advice from the Victorian Branch of the British Medical Association. It is reprinted here by courtesy of the Branch.

British Medical Association.

VICTORIAN BRANCH: SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held on May 3, 1958, at Colac.

Hospitalization and the Means Test.

DR. T. W. JENKINS read a paper entitled "Hospitalization and the Means Test". He said the means test, discarded shortly after the last war, had been reintroduced by an amendment of the *Hospitals and Charities Act* on July 1, 1956. Its avowed purpose was to determine the eligibility for treatment as public patients of applicants for such treatment, and thus to reserve the beds in public hospitals, and the public beds in community hospitals, for those

[1] *Brit. M. J.*, 1952, 1: 1294; 1957, 1: 639.

patients whose financial status was such that they could not afford to pay hospital fees at private or intermediate rates. In the years when the means test was suspended, any person, whatever his financial position, could elect to be admitted as a public patient, and there was little doubt that during those years many public hospital beds were occupied by patients who could have afforded at least intermediate fees. Many medical practitioners thought that not only the hospitals, but they themselves, were being deprived of part of their legitimate income in that way, as of course doctors were forbidden by law to charge public hospital patients for their services. The reaction of the medical profession to the news that the means test was to be reintroduced was, in general, one of relief and optimism. The feeling was that, with the state of prosperity of the country, together with the rapid growth of various hospital benefit organizations, a considerable increase in the proportion of non-public to public patients could be expected, with a consequent easing of the strain on public hospital accommodation and a significant increase in their own financial expectations. That optimism was fostered by the simultaneous introduction of the "service charge" of 36s. per day for public patients, of which 28s. would have to be found by the patient himself. It was thought that many people would prefer to pay the small difference between that rate and the intermediate scale of charges, particularly if they qualified for the substantial rebates offered by the benefit associations.

Dr. Jenkins went on to say that his paper was the outcome of a study of admissions to the Colac District Hospital for a full year immediately preceding, and immediately following, the reintroduction of the means test, in an attempt to discover whether that optimistic view had, in fact, been justified. The records of such a hospital offered unusually good grounds for such a study, in that it was the only hospital of its size in a considerable area of well-populated country, and catered for all classes of patients. The admission rate was believed to be high enough to provide significant figures, and the fact that all doctors engaged in practice in the district held honorary appointments, and thus had access to public beds for their patients, was an additional advantage when a study of that kind was undertaken. Dr. Jenkins stressed the fact that the Colac Hospital did not carry any resident medical staff, patients in the public sections being cared for by the doctors of their choice, who were also their family doctors. The hospital records showed that for the year ending June 30, 1956—the year immediately preceding the reintroduction of the means test—admissions totalled 2572; of those patients 803 (31·2%) were admitted to public wards. In the following year a total of 3448 patients were admitted, and of those 935 (27·1%) were admitted as public patients. Thus, in the year following the resumption of the test, there was a decrease in the public admission rate of 4·1%. In other words, the ratio of public to non-public patients was 1·0:2·2 for the year preceding the resumption of the test, and 1·0:2·7 for the following year. According to those figures, the effect on the income of medical practitioners could not be regarded as of any great significance. A general practitioner, practising in a town with good hospital facilities, whose practice brought him in £5000 *per annum*, could expect some £2000 of that amount to be derived from his treatment of in-patients. If, as was indicated by the Colac figures, the proportion of patients from whom he could expect to receive fees had increased by some 4%, then an increase of £80 to £100 *per annum* would represent the maximum by which he could expect his earnings to increase as a direct result of the application of the means test. The medical care of the poor, without expectation of any material reward, had for many years been regarded by the medical profession as part of their duties to their fellow men—a duty which had been discharged cheerfully and without fuss or publicity, and one which, although at times onerous, was regarded by most practitioners as a privilege rather than as a burden. However, in times such as the present it must at times occur to many medical practitioners to wonder whether some of the occupants of the public beds were really the poor and needy. It was with that thought in mind that he proposed to attempt to evaluate the means, or income, test, at present applied.

Dr. Jenkins then said that in order that patients might qualify under the test, certain financial criteria, laid down by the Hospitals and Charities Commission, must be satisfied, except in the case of pensioners and their dependants who qualified automatically. Those criteria included limitation on assets, which should not exceed £2000, and also a limitation on the weekly income of the family. It had to be understood that the income test was a hospital matter, and was applied by a member of the administrative staff of the hospital. In order to assess the family income, the following procedure was adopted. First, the gross family weekly income must be stated. That included earnings by husband and/or wife, but not by children, nor did it include income from child endowment. From that figure deductions were then made: £1 for the wife or other adult dependant (the number of adult dependants for whom £1 each could be deducted was not specified, but an adult was regarded as a person over the age of 16 years); £1 each for the first and second children; £1 10s. for the third child; £2 each for the fourth and subsequent children, provided the children themselves derived no income. A further deduction of up to £4 per week was allowable for rent or house purchase repayment. When those deductions had all been made from the gross weekly income, a figure remained which was called the net weekly income. If that figure equalled, or was less than, the basic wage, then the patient qualified for admission to a public bed. The basic wage in Victoria was at present £13 3s. That meant that the permissible income of a man with a wife and three children, for any or all of them to qualify, would be £21 13s. per week *plus* child endowment of £1 5s., a total of £22 18s. per week. It should be noted that every person over the age of 16 years was the subject of a separate test, even if he was totally dependent on his parents, and unless his net weekly income exceeded the basic wage, he qualified for admission as a public patient. The implication of that interpretation, which had been confirmed by responsible hospital officials, was that practically every person in the State between the ages of 16 and 21 years would be entitled to treatment as a public patient, whatever the family financial status might be. The means test having been passed, the patient was then required to read a section of the *Hospitals and Charities Act*, and also a section of the *Police Offences Act*, both of which dealt with the penalties which might be inflicted on persons making false statements in an effort to impose on a charitable institution. Finally, he was required to sign a statement to the effect that the answers he had given were true, and that he had read the required sections of law.

Dr. Jenkins went on to say that the next point of interest that arose, though not perhaps directly connected with the means test, concerned the so-called service charge of 36s. per day, of which the Commonwealth Government paid 8s. That charge was not imposed on pensioners or their dependants. In the case of others, the local committee of management of the hospital was given the power to remit, in the event of hardship, up to 18s. of that charge, so that the actual cost to the patient for his public bed might fall as low as 10s. per day. In actual fact, it appeared that that remission was seldom, if ever, referred to the committee, but the assessing officer asked the patient if he was prepared to contribute 28s. per day and, if the answer was in the negative, reached an agreement with the patient as to the amount that would be paid. However, if the patient was a member of a benefit organization, he was automatically assessed at the 36s. rate, which was generally more than covered by the rebates he would receive. Dr. Jenkins said that with the continuing shortage of public hospital beds throughout the land, and the need for more and more money to meet hospital costs, it seemed obviously to the advantage of hospital authorities to obtain fees at intermediate or higher rates as often as possible. It would certainly be to the material advantage of the medical profession in general if a larger proportion of patients was diverted from public to non-public beds, though it was certain that such a course would fail to recommend itself to the medical profession if it entailed real hardship. In any event, it was thought that medical practitioners, part of whose living depended on whether their patients occupied paying or non-paying beds, should feel free to examine and discuss the working of the means test, and if they thought that it conflicted unnecessarily with their interests, then they should feel free to state their opinion publicly.

Dr. Jenkins then said that in any discussion of the test there were three aspects to be considered. First, there was the financial criteria; secondly, the question whether the opportunity existed for unscrupulous persons to falsify their position successfully; and finally, the question whether the test as it stood was being applied by hospital officials sufficiently rigidly to ensure that all interested parties were fairly treated. Discussing first the financial criteria of the test, Dr. Jenkins said that sufficient had already been said to indicate that the terms of the means test could at times be extremely liberal, particularly in the case of what might be called the junior adults. However, they should return to the working man with a wife and three children, and take his case a step further by supposing that, for approximately 3s. per week, he joined the benefit organization that operated in the Colac district. Perhaps one of his children might require hospital treatment. On the man's total weekly income of £22 18s. his child qualified for a public bed. During the time when the child was in hospital, he would receive from his benefit organization 48s. per day *plus* 8s. per day which the organization would pay the hospital on his behalf. From that 48s. he must pay the hospital 28s. The net result was that his weekly income actually rose to an amount of £29 18s. per week, but as his benefits would not be paid until after the child was discharged from hospital, he was still not disqualified under the means test. Thus the

hospital got 36s. per day, the family got £1 per day, and the doctor got the satisfaction of returning the child, restored to health, to his home. It was obvious that a different set of circumstances could arise if the breadwinner of the family was the victim of illness. Dr. Jenkins understood that discussions had already been held on the desirability of varying the means test according to whether the person needing hospital treatment was, or was not, the main wage earner.

With regard to the opportunity for attempted imposition, Dr. Jenkins said that it was clear that, with the present form of the test, such an opportunity did exist. Although it was not his purpose to discuss whether imposition was practised, and to what extent, he thought that there were few practitioners present who could not call to mind one or two cases in which they had had grave suspicions. One such case which had occurred in Colac recently involved a man who stated his gross weekly income as £9, and then later, when a history was taken, admitted to having eight or nine pots of beer a day and smoking two large packets of "Craven A" cigarettes daily, thus accounting for some £5 of his gross income. In considering that matter, they might ask whether it would not be psychologically sounder if the applicant was required to digest the punitive clauses of the law before making his financial statement, instead of after the die had been cast. Also, it would be interesting to know whether the Hospitals and Charities Commission would be prepared to prosecute, as an exemplary measure, if presented with an authenticated case of misrepresentation. Finally, it might be worth considering whether it would be competent to ask an applicant to sign an authority for the hospital officials to take such steps as they might consider necessary to verify the statements made.

Turning to the question of whether the hospital officials were applying the means test in strict conformity with its rules and spirit, Dr. Jenkins said that there could be little doubt that they were doing so, within the limitations imposed on them by the form and scope of their inquiries. Hospital officials could not be expected to act as inquiry agents, and even though they (like the doctors) might often have their suspicions, they had in general no option but to accept the answers given.

Finally, Dr. Jenkins referred to the system of admission to hospital. He said that there could be little doubt that if there was instituted a strictly rotational system of admission to public wards, under whatever honorary medical officer happened to be receiving at the time, many patients would prefer to pay extra hospital fees so that they could be attended by the doctor of their choice in intermediate wards. While such a system was satisfactory for the very large public and base hospitals, he thought that most country practitioners would agree that it would soon lead to utter chaos in their private practices and that its introduction would be strenuously resisted in areas served by hospitals of less than base status. Such a system would, in addition, carry an odour of moral coercion which would be distasteful to patients and doctors alike.

In conclusion, Dr. Jenkins said that in his appreciation of the means or income test he had tried to view the whole question as objectively as possible, and to refrain from expressing personal opinions except when they were unavoidable. The paper had been prepared as a general review of the situation.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

APPEAL TO THE MEDICAL MEN OF AUSTRALIA.[1]

[From the *Australasian Medical Gazette*, June, 1888.]

IN carrying on the classes of the Medical School at the University, anatomical specimens are, as you are aware, indispensably necessary. The Government, through the Senate, has with a generous hand supplied the means for the purchase of apparatus which can be bought for money, but I need hardly point out that pathological specimens *can not be bought for money*. They can be obtained solely through the generosity of those who procure and possess them—the practitioners of the country.

Any individual practitioner has usually only a few specimens, and these, while highly *interesting*, can hardly be *instructive* to himself, though they may be made extremely instructive to others, if they are properly mounted and labelled, and placed beside other and more or less similar preparations. Such a collection—an Anatomical Museum—I am now striving to found at the University, and if only material can be sent in, I undertake that it will be properly cared for and preserved, so that the greatest good may accrue to the greatest number.

Medical Men I appeal to with confidence, since I know that in no other profession is there so great a love of the work for the work's sake as in our own, and because the efficiency of the University is an affair of national importance, this undertaking commands our sympathy and support as citizens.

T. P. ANDERSON STUART, M.D.,
Professor of Anatomy.

Sydney University.

[1] From the original in the Mitchell Library, Sydney.

Australian College of General Practitioners.

QUEENSLAND FACULTY.

Annual Report.

THE Board of the Queensland Faculty of the Australian College of General Practitioners sends the following report for the Faculty for the year 1957-1958.

The office-bearers for the year 1957-1958 are as follows: *Provost*: G. V. Hickey. *Faculty Board*: Chairman, H. S. Patterson; Vice-Chairman, B. N. Adsett; Honorary Treasurer, A. J. Parer; Honorary Secretary, W. J. Hamilton; Assistant Honorary Secretary, R. A. Miller; Lay Secretary, R. Spence. *Members*: I. H. Chenoweth, Ruth Chenoweth, H. W. A. Forbes, P. W. Hopkins, L. A. Little, S. A. McDonnell, L. P. Musgrave.

Membership of the Faculty is 76 members and 28 associates.

The Board of the Queensland Faculty is represented on the University of Queensland Faculty of Medicine and on the Research Committee of the Australian Council by Dr. H. S. Patterson, on the Post-Graduate Medical Education Committee by Dr. S. A. McDonnell, and on the editorial committee of *Annals of General Practice* by Dr. R. A. Miller (during the absence abroad of Dr. W. J. Hamilton).

Annual Meeting and Dinner.

The fourth annual general meeting of the Faculty was held at the United Services Club on September 12, 1957, at 4.30 p.m. This was followed by the annual dinner held at the United Services Club, at which the chairman of the Faculty, Dr. H. S. Patterson, welcomed a large number of distinguished medical guests, including the 1957 Bancroft Orator, Professor A. A. Abbie, of the University of Adelaide. The retiring Provost, Dr. Paul Hopkins, proposed the toast "Our Visitors", which was responded to by the President of the Queensland Branch of the British Medical Association, Dr. Felix Arden, and the chairman of the Post-Graduate Medical Education Committee, Sir Alexander Murphy. At the conclusion of the dinner those present adjourned to the Medical School, where they heard Professor A. A. Abbie deliver the Bancroft Oration.

Post-Graduate Week-End.

This was held from May 2 to 4, 1958, in the conference room of Lennon's Broadbeach Hotel, and was attended by 60 doctors. The conference room, situated on the top floor of the hotel, is glass enclosed, commands a magnificent view of the coast, and is an ideal setting for such a meeting. On the night before the conference commenced, an informal party was held in the hotel for members and their wives. The official opening was performed next day by the Minister for Health for the Commonwealth, Dr. the Honourable D. A. Cameron, O.B.E., M.P., who was welcomed by the Provost of the Queensland Faculty, Dr. Glen Hickey. The principal guest lecturer was Dr. T. M. Greenaway, physician, of Sydney, who gave two addresses entitled "Iatrogenic Disease" and "Drug Reactions and Their Significance". Dr. Kurt Aaron was chairman of two panel discussions. The first was "Digest of Progress", and those taking part were

Dr. Neville Davis ("The Modern Treatment of Varicose Ulcers"), Dr. Jonn Sutherland ("Antibiotics and Diuretics"), Dr. Keith Cockburn ("The Use of Endocrines in Gynæcology") and Dr. Howard Tait ("Tranquillizers"). The second panal discussion was a "Symposium on Bronchial Asthma", in which Dr. John Fitzwater, Dr. Domville Cooke and Dr. Howard Tait took part. A small trade exhibit by pharmaceutical houses was held in conjunction with the conference, and representatives of the firms concerned expressed their appreciation of the invitation to hold such a display.

A formal vote of thanks to the speakers was moved by the President-Elect of the Queensland Branch of the British Medical Association, Dr. S. A. McDonnell, and seconded by the Honorary Secretary of the Australian Council of the College of General Practitioners, Dr. H. M. Saxby.

The Australian College of General Practitioners.

A special general meeting of the Faculty was held at Broadbeach at the conclusion of the post-graduate week-end on May 4, 1958, and it resolved that the Queensland Faculty of the College of General Practitioners be dissolved as from June 30, 1958, all assets being transferred to the Queensland Faculty of the Australian College of General Practitioners. At the same time it is evident that strong ties will continue to exist between the members of the new Australian College and the parent British College, with whom many Queensland members will retain a dual membership.

Training in Surgery.

The Queensland Faculty is firmly of the opinion that some special form of training should be available for country general practitioners, who frequently have to undertake major emergency surgery. Such training is not with a view to acquiring a higher surgical diploma, and the diploma granted by the Royal Australasian College should continue to be the standard of entry for the surgeon specialist. In isolated country districts, however, country doctors have to be able to deal with many emergencies that are unknown to general practitioners practising in or near cities, and they should be trained in surgical emergency procedures.

Section of General Practice at B.M.A. Congresses.

The Faculty will also continue to press for inclusion of such a section at future congresses, despite its rejection by the Federal Council of the B.M.A., because it believes general practitioners should have a forum which will enable them to discuss and pool their experiences and opinions. General practitioners are usually diffident about speaking at scientific discussions between specialists.

Negotiations with Outside Bodies.

In a letter addressed to the B.M.A., the Queensland Faculty has reaffirmed its belief that all medico-political negotiations should remain a function of the B.M.A.

British Medical Association Library.

The offer of the Queensland Faculty to undertake the annual payment of subscriptions to *The Practitioner* and *The Lancet*, with a view to enabling the B.M.A. to divert moneys at present expended on periodicals towards the purchase of books, has been accepted with thanks. The Faculty has suggested that the other Colleges and special sections could be invited to make similar subscriptions towards the periodicals dealing with their various specialities.

The "Annals of General Practice".

The Queensland Faculty is in favour of continuing the publication of the journal of the College in Australia, provided the material published is of a high standard, and providing no great financial burden is imposed on the College by the publication. It has been decided that each successive number of the *Annals* should appoint a different faculty in turn. The Queensland Faculty is to be responsible for the December issue of this year.

Jackson Lecture.

This is an historical lecture delivered annually at a meeting of the Queensland Branch of the British Medical Association. This year it is to be delivered by Dr. Mervyn Patterson, a Past President of the B.M.A. in Queensland, and a member of the Queensland Faculty of the College. Dr. Patterson is one of the oldest actively practising general practitioners in Queensland, and the title of his lecture is "Fifty Years in General Practice".

The Under-Graduate Education Committee of the Faculty.

Chairman and Honorary Secretary: R. A. Miller.

The Faculty considered a suggestion by the Professor of Preventive and Social Medicine at the University of Queensland, Professor Douglas Gordon, that members of the Faculty should introduce fourth year medical students to families in their practice, to enable the students to study factors such as poor housing, unemployment, poverty, alcoholism, sickness of members of the family, difficulties of looking after elderly relatives, and the need for community assistance such as is provided by kindergartens, child-minding centres, etc. While fully in sympathy with such a scheme, the Board considered that the fourth year of the medical course was too early to introduce students into the homes of private patients with a view to carrying out such a survey.

Two members of the Faculty, Dr. H. S. Patterson and Dr. S. A. McDonnell, were appointed members of a subcommittee by the B.M.A. to inquire into a report on the failure rate of medical students.

One lecture each by Dr. Patterson and Dr. Miller was given to fifth year medical students on aspects of general practice. Next year a further lecture by a member of the Faculty may be given in the forensic medical course on certificates used in practice.

It was noted with regret that the response of students to enrolment in the apprenticeship scheme was not as good as last year.

The Post-Graduate Education Committee of the Faculty Board.

Chairman and Honorary Secretary: H. W. A. Forbes.

The Faculty has now had representation on the Queensland Post-Graduate Medical Education Committee for four years, and it is considered that the voice of the College of General Practitioners on this committee has been of value when decisions are made about the post-graduate education of the general practitioner.

The Broadbeach post-graduate week-end organized by the Faculty now seems established as an annual event in the medical post-graduate calendar. The Queensland Faculty gratefully acknowledges the cooperation of Pfizer Pty. Ltd., who for the second year in succession have made a generous grant towards the defraying of expenses of this conference.

The Research Committee of the Faculty Board.

Chairman and Honorary Secretary: H. S. Patterson.

The research panel, consisting of Dr. D. W. Johnson (convenor), Professor J. Tyrer, Dr. E. H. Derrick, Dr. D. A. Henderson and Dr. J. I. Tonge, met and made a number of recommendations regarding research projects which could be undertaken by members of the Faculty. Subsequently at the Broadbeach conference Dr. D. W. Johnson and Dr. D. A. Henderson spoke on "Research in General Practice", and in the discussion which followed it was evident that a number of members were interested in undertaking general practitioner research.

All members of the Faculty have been circularized, and many replies have come in from those willing to undertake clinical research in general practice.

Committee in Preventive Medicine.

At the request of the Federal Minister for Health (Dr. the Honourable D. A. Cameron), a Federal Committee in Preventive Medicine has been set up to consider matters appertaining to preventive medicine at the general practitioner level. Faculty Boards in each State have been asked to establish State committees. The Queensland Committee comprises Dr. H. S. Patterson (chairman), Dr. B. N. Adsett, Dr. D. A. Dowling, Professor D. Gordon, Dr. D. W. Johnson, Dr. L. A. Little and Dr. R. A. Miller. No meeting of the committee has yet been held.

Membership.

A drive for membership has been made during the past few months and membership has increased from 104 as at June 30 this year to 163.

Queensland Centenary Year.

Next year, to mark Queensland's centenary, a meeting of the Council of the new Australian College is to be held in Brisbane, and tentative plans are already being made for this meeting.

Conclusion.

Altogether, the Faculty has had a year of steady progress. It has seen the establishment of the Australian College, it has had a remarkable increase in membership, and it is meeting an increasing influence of medicine in this State.

H. S. PATTERSON,
Chairman.

Office-Bearers for 1958-1959.

The Board of the Queensland Faculty of the Australian College of General Practitioners announces that the office-bearers for 1958-1959 are as follows: *Provost*: H. S. Patterson. *Faculty Board*: Chairman, B. N. Adsett; Vice-Chairman, L. A. Little; Honorary Secretary, Robert Miller; Honorary Treasurer, A. J. Parer; Lay Secretary, Robert Spence. *Members*: I. H. Chenoweth, H. W. A. Forbes, P. W. Hopkins, S. A. McDonnell, L. P. Musgrave, B. C. Harvey, W. J. Hamilton and G. V. Hickey.

The Post-Graduate Committee is as follows: S. A. McDonnell (chairman), L. A. Little, H. W. A. Forbes, A. J. Parer and G. V. Hickey.

The following comprise the Undergraduate Committee: Robert Miller (chairman), L. P. Musgrave, W. J. Hamilton and B. C. Harvey.

The Preventive Medicine Committee is as follows: H. S. Patterson (chairman), I. H. Chenoweth, P. W. Hopkins, Professor D. Gordon and D. W. Johnson.

The following representatives were elected: Post-Graduate Education Committee, S. A. McDonnell; Australian Council, B. N. Adsett and Robert Miller; *Annals of General Practice*, B. N. Adsett, Robert Miller and H. S. Patterson.

Correspondence.

DIAGNOSTIC UTERINE CURETTAGE.

SIR: I read with interest Dr. L. J. Shortland's letter in the Journal of November 1, 1958, on "Diagnostic Uterine Curettage".

My own experience in this matter has been too limited for me to be dogmatic. I had a case some twenty years ago in a patient aged 45 years. She had been bleeding irregularly for about three months. A curetted specimen showed adenocarcinoma. On examination after hysterectomy the area affected was macroscopically the size of a split pea in the fundus uteri. Within six months her inguinal glands were palpable, and she died six months later of metastases in all her inguinal and pelvic lymphatic glands. Since then I have felt that any woman bleeding irregularly, and past the child-bearing age, should have her uterus removed. This, of course, does not necessarily apply except in cases where the diagnosis is in doubt.

Yours, etc.,

F. CH. DE CRESPIGNY.

Ingor Street,
Ararat,
Victoria.
January 21, 1959.

AUSTRALIAN RHEUMATISM ASSOCIATION (VICTORIAN BRANCH).

SIR: The machinery for the furtherance of study in the rheumatic diseases has existed in Australia for some time. The Australian Association of Physical Medicine and Rehabilitation has celebrated its thirteenth birthday, and more recently the Australian Rheumatism Association came into being with a flourish of trumpets. Both these groups are open to members of the British Medical Association who are interested enough to apply, and it is strange and disappointing to find that the combined strength of the two associations is comparatively low.

As Dr. Kelly (MED. J. AUST., December 27, 1958) and Dr. Alpers (MED. J. AUST., January 17, 1959) have suggested, there appears to be some lethargy in certain aspects of leadership in the Australian Rheumatism Association, and this is no doubt due in part to the great distances between the branches and even individual members of the same branch. Again, it seems to be inevitable in any field of medical endeavour that differences of opinion occur among the leaders as to the *modus operandi*—a rift which spreads discouragement among the members and adds further disappointment to the long-suffering patient.

One useful activity that suggests itself is that clinicians, say, in Sydney or Melbourne, who have access to large rheumatic clinics, should set themselves the task of evaluating new anti-arthritic drugs and circularize the findings amongst members. This would not require the statistical accuracy necessary for publication in medical journals, but would be of great value as a guide to the isolated rheumatologist who may waste months checking the dosage and potential of a new pharmaceutical in his private practice.

Surely the cry is too loud and the objective too vast to permit the idiosyncrasies of the individual to obscure our vision of Olympus?

Yours, etc.,

J. F. DREW.

Antonas Building,
440 King William Street,
Adelaide.
January 27, 1959.

THE INVESTIGATION OF JAUNDICE IN SURGICAL PRACTICE.

SIR: I found considerable interest in Dr. Edward Cortis's article on "The Investigation of Jaundice in Surgical Practice" (MED. J. AUST., January 10, 1959), but I wish to comment on the statement that "cholecystography and intravenous cholangiography are ineffective because of poor secretion of the dye, and are contraindicated in the presence of jaundice, the dangers being liver damage and occasionally acute pancreatitis".

I have found that both procedures can be very helpful in the presence of jaundice, as they will very often produce sufficient contrast in the gall-bladder to show up transradiant calculi, and if the jaundice has only been apparent for a week or less, excellent skiagrams may generally be obtained, whilst if the jaundice is of the haemolytic type, the tests are completely effective at any stage, and, although it is often stated that there may be some danger of liver damage by these media, I have yet to encounter it.

It must be admitted, however, that the test is not worth while in long-continued deep jaundice or in the two or three weeks after it has disappeared.

Another point which I would like to make is in connexion with the use of the term "dye", and I must admit that it is a little unfair to take Dr. Cortis to task in this, as the word is most widely used both in X-ray reports and medical literature. However, it is, nevertheless, a fact that "Telepaque" used in cholecystography is 3-(3-amino-2,4,6-triiodophenyl)-2-ethylpropanoic acid, and "Biligrafin" used in intravenous colecystangiography is the methylglucaminate of N,N'-adipic-di-(3-amino-2:4:6-triiodobenzoic acid), and neither of these substances is a dye.

Also on the subject of media, it is suggested that diodone may be used for operative cholangiography, but as diodone is partially absorbed from the alimentary tract, the use of "Biligrafin", which is not absorbed, would probably be more suitable.

Yours, etc.,

GEOFFREY HAGARTY.

26 East Parade,
Eastwood,
N.S.W.
January 20, 1959.

Post-Graduate Work.

ROYAL PRINCE ALFRED HOSPITAL: EAR, NOSE AND THROAT DEPARTMENT.

Seminar Programme, 1958-1959.

THE staff of the Ear, Nose and Throat Department will conduct a seminar on the second Saturday of every month at 8 a.m. in the Scot Skirving Lecture Theatre, Royal Prince Alfred Hospital. The main speaker will not exceed forty minutes, and there will be a discussion at the conclusion of

his remarks. All medical practitioners and clinical students are invited to attend.

At the next seminar, to be held on February 14, 1959, Dr. H. D. Raffan will discuss "Strictures of the Œsophagus".

SEMINARS AT ROYAL PRINCE ALFRED HOSPITAL.

SEMINARS will be held at the Royal Prince Alfred Hospital during 1959 on Fridays, from 1.15 to 2.15 p.m., in the Scot Skirving Lecture Theatre. The programme from February to June is as follows:

February 20, Cardio-Vascular Section, "The Third World Cardiology Conference, Brussels, 1958", Dr. J. K. Maddox, Dr. R. B. Blacket and Dr. B. C. Sinclair-Smith. February 27, Cardio-Vascular Section, "Neuro-Muscular Disorders of the Œsophagus", Professor A. S. Johnston, Leeds University (by invitation).

March 6, Thoracic Section, "Personal Experiences Overseas", Dr. H. M. Rennie. March 13, Neurology Section, "The Electromyogram in Diseases of the Peripheral Nerves and Muscles", Dr. L. Rail. March 20, Gastro-Enterology Section, "Hepatic Complications of Ulcerative Colitis", Dr. R. W. Boden and Sir William Morrow.

April 3, Endocrinology Section, "The Virilizing Syndromes", Dr. R. P. Shearman. April 10, Thoracic Section, "The Management of Pulmonary Tuberculosis", Sir Geoffrey Todd, King Edward VII Sanatorium, Midhurst (by invitation). April 17, Hæmatology Section, "Mast Cells and Histamine", Dr. G. T. Archer (by invitation). April 24, Cardiology Section, "The Eisenmenger Syndrome", Dr. H. A. Fleming.

May 1, Gastro-Enterology Section, "Fulminating Ulcerative Colitis", Dr. S. J. M. Goulston and Dr. J. G. D. Rankin. May 8, Neurology Section, "The Neurology of Alcoholism", Dr. B. Turner, Dr. C. Hughes (by invitation) and Dr. J. L. Allsop. May 15, Endocrinology Section, "Diagnostic Tests with Radioiodine", Dr. I. D. Thomas and Dr. T. H. Oddie (by invitation). May 22, Hæmatology Section, "The Treatment of Leukæmia", Dr. I. S. Collins. May 29, Pædiatrics Section, "Recurrent Abdominal Pain in Childhood", Dr. W. H. Cary.[1]

June 5, Cardiology Section, "Dye Dilution Techniques", Dr. G. D. Thorburn. June 12, Thoracic Section, "The Silent Solitary Pulmonary Nodule", Mr. Rowan Nicks. June 19, Gastro-Enterology Section, "The Regeneration of Gastric Mucosa", Mr. G. W. Milton. June 26, Renal Section, "Tests of Renal Function", Dr. H. M. Whyte (by invitation).

Each seminar will be followed by a clinico-pathological session at 2.15 p.m., by "unit rounds" at 3.30 p.m. and by "grand rounds" at 5 p.m.

SEMINARS AT THE WOMEN'S HOSPITAL, CROWN STREET, SYDNEY.

SEMINARS on obstetric and gynæcological subjects will be held at the Women's Hospital, Crown Street, Sydney, on the first Wednesday of each month at 4.30 p.m. in the main lecture theatre. All members of the medical profession are invited to attend. The programme for the first half-year is as follows.

February 4: "Induction of Labour." Chairman, Dr. J. Chesterman; speakers, Dr. F. Bellingham, Dr. M. Drummond, Dr. R. Mackey and Dr. W. McBride.

March 4: "Diagnosis and Treatment of Placenta Prævia." Chairman, Dr. S. Devenish Meares; speakers, Dr. K. McGarrity, Dr. R. Macbeth, Dr. D. McGrath and Dr. R. Bowman.

April 8: "Uterine Inefficiency." Chairman, Dr. F. Bellingham; speakers, Dr. J. Chesterman, Dr. M. Drummond, Dr. R. Mackey and Dr. W. McBride.

May 6: "Indications for Cæsarean Section." Chairman, Dr. R. Stevenson; speakers, Dr. S. Devenish Meares, Dr. K. McGarrity, Dr. D. McGrath and Dr. R. Bowman.

June 3: "Management of Premature Labour." Chairman, Dr. J. Chesterman; speakers, Dr. F. Bellingham, Dr. M. Drummond, Dr. R. Mackey and Dr. W. McBride.

[1] The seminar on May 29 will be followed by a clinical meeting at 4.30 p.m. at the Royal Alexandra Hospital for Children, Camperdown.

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED JANUARY 3, 1959.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	..	1	1(1)	..	..	..	..	..	2
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	..	..	..	..	..	..	2	..	2
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	..	..	..	..	..	..	..	..	..
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	..	..	..	..	..	..	..	..
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	1(1)	1(1)	..	..	..	..	..	..	2
Diphtheria	..	..	1(1)	1(1)	3(2)	..	5	..	10
Dysentery (Bacillary)	..	..	..	..	..	..	..	..	..
Encephalitis	..	..	..	..	..	..	..	..	..
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	1	..	..	..	..	..	..	1
Hydatid	..	..	..	..	..	..	..	..	..
Infective Hepatitis	39(14)	14(1)	..	1	2(1)	..	..	..	56
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	..	..	..	..	4	..	4
Leptospirosis	..	..	..	..	..	..	..	..	..
Malaria	..	..	..	..	..	..	..	..	..
Meningococcal Infection	..	1(1)	2(1)	..	..	..	..	..	3
Ophthalmia	..	..	..	..	..	..	..	..	..
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	..	..	..	..	..	..	..	..	..
Puerperal Fever	..	..	..	..	..	..	..	..	..
Rubella	..	10(5)	..	1	25(22)	..	..	6	42
Salmonella Infection	..	..	..	..	2(2)	..	..	..	2
Scarlet Fever	2(2)	2(2)	2(2)	..	3(3)	..	..	..	9
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	1(1)	..	..	..	..	..	1
Trachoma	..	..	..	..	..	..	2	..	2
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	20(13)	2	17(6)	5(4)	7(5)	..	8	..	54
Typhoid Fever	..	..	..	..	..	..	..	..	..
Typhus (Flea-, Mite- and Tick-borne)	..	..	..	..	..	..	..	..	..
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

Corrigendum.

TRIPLE GALL BLADDER: A CASE OF DOUBLE GALL BLADDER WITH ASSOCIATED ANOMALOUS GALL BLADDER.

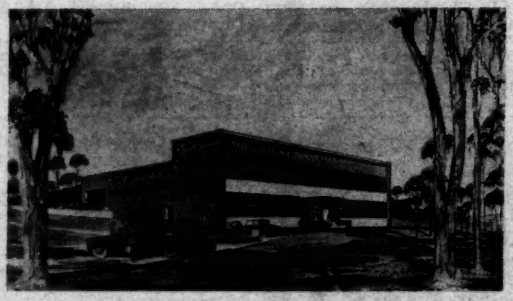
AN unfortunate error has been made in the numbering of the illustrations to the Report of Case entitled "Triple Gall Bladder: A Case of Double Gall Bladder with Associated Anomalous Gall Bladder", by Anthony R. Kelly, in the issue of January 24, 1959, at page 124. The illustration marked Figure I should have been marked Figure III (with the corresponding legend) and vice versa. We regret this error.

Notes and News.

Opening of Upjohn Company's New Factory.

The modern factory now being completed at Rydalmere, N.S.W., for the Upjohn Company (Aust.) Pty. Limited will be opened by His Excellency the Governor of New South Wales, Lieutenant-General Sir Eric Woodward, K.C.M.G., C.B., C.B.E., D.S.O., on Thursday, February 19. The President of the world-wide Upjohn Group (Dr. E. Gifford Upjohn) and senior executives will visit Australia for the opening ceremony.

The new building, of which an artist's impression is given in the accompanying figure, is partly recessed into a lawn-covered sloping hillside on the former Rydalmere Golf Links. It houses one of the most modern pharmaceutical laboratories in the world, which incorporates many of the features



of the parent plant in Kalamazoo, Michigan, U.S.A. A large conference room will be made available to medical and pharmaceutical groups, in addition to its normal use for sales conferences, lectures and film screenings. The quality-control laboratory contains the latest instruments, capable of giving analytical accuracy far exceeding any requirements of the British Pharmacopœia.

A feature of the opening ceremony will be the presentation by the Governor to the Mayor of Parramatta (Alderman E. A. Mobbs) of the deeds to 25 acres of the old golf links. The Upjohn Company is giving the land to the City of Parramatta for restoration as a public golf course, to be known as Upjohn Park.

Notice.

THE CHILDREN'S MEDICAL RESEARCH FOUNDATION OF N.S.W.

THE following is a list of donations to the Children's Medical Research Foundation of N.S.W. received from members of the medical profession in the period January 14 to 27, 1959.

Dr. R. Erby (sixth donation): £10.

Dr. T. Tidswell: £5 5s.

Previously acknowledged: £7871 16s. 9d. Total received to date: £7887 1s. 9d.

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Cockburn, Campbell Geoffrey, M.B., B.S., 1957 (Univ. Sydney), 143 Cathedral Street, Woolloomooloo.

Deaths.

THE following deaths have been announced:

DOUGLAS.—John Campbell Douglas, on January 16, 1959, at Yallourn, Victoria.

DILLON.—Alan Michael Dillon, on January 20, 1959, at Melbourne.

MCCARTHY.—Francis Justin McCarthy, on January 22, 1959, at Goulburn, New South Wales.

Diary for the Month.

FEB. 10.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
FEB. 12.—New South Wales Branch, B.M.A.: Public Relations Committee.
FEB. 13.—Queensland Branch, B.M.A.: Council Meeting.
FEB. 16.—Victorian Branch, B.M.A.: Finance Subcommittee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales. Anti-Tuberculosis Association of New South Wales. The Maitland Hospital.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Editorial Notices.

ALL articles submitted for publication in this Journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations, other than those normally used by the Journal, and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of the article. The abbreviations used for the titles of journals are those of the list known as "World Medical Periodicals" (published by the World Medical Association). If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

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